

ROSIE THE RIVETER NATIONAL HISTORICAL PARK, FORD ASSEMBLY PLANT HAER No. CA-326-H
(Rosie the Riveter National Historical Park, Richmond Assembly Plant
Rosie the Riveter National Historical Park, Richmond Tank Depot
)
Rosie the Riveter WW II Home Front National Historical Park
1400 Harbour Way South
Richmond
Contra Costa County
California

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C St. NW
Washington, DC 20240

HISTORIC AMERICAN ENGINEERING RECORD

ROSIE THE RIVETER NATIONAL HISTORICAL PARK, FORD ASSEMBLY PLANT (RICHMOND ASSEMBLY PLANT) (RICHMOND TANK DEPOT)

HAER No. CA-326-H

LOCATION: 1400 Harbour Way South, Richmond, Contra Costa Country, California

DATE OF CONSTRUCTION: 1931; alterations 1942, 1945; closed 1955

DESIGNER/ENGINEER/
FABRICATOR: Albert Kahn Associates, Ford's Power and Construction Department

PRESENT OWNER: National Park Service

SIGNIFICANCE: The Ford Assembly Plant is historically significant because of its association with several individuals and historical developments important to the history of the United States, especially the mobilization of American industry for war production during World War II. The plant was designed to receive unassembled Ford Company parts by ship or railroad and then supply assembled autos to Ford dealers in northern California and Hawaii. During the war, the Richmond Tank Depot, as it was then called, had two basic functions: assembling jeeps and processing combat vehicles for shipment. During the war, the depot employed a relatively large number of women and African Americans. With the war over in 1945, Ford reconverted the Richmond plant to the production of civilian cars and trucks. The plant continued to serve that function within the Ford production system until 1955 when, because of the greatly expanded market for cars in California's post-war economy, the company decided to move its Bay Area operation to a larger site in Milpitas. The Ford Motor Company closed the Richmond plant that year.

HISTORIAN: Fredric L. Quivik, Summer 2002

PROJECT INFORMATION: In 2001, the Historic American Engineering Record (HAER) began assisting the Rosie the Riveter World War II Homefront National Historical Park, a newly established National Park unit, by documenting associated significant structures within its immediate area. The project is a cooperative endeavor among: the California Coastal Conservancy, Mary Smalls, Project Manager; the Richmond Redevelopment Agency, Gary Hembree, Project Manager; Rosie the Riveter World War II Homefront National Historical Park, Judy Hart, Superintendent; and the Historic American Engineering Record, Richard O'Connor, Project Leader.

Fredric Quivik produced the historical report, conducting research at the Research Center of the Henry Ford Museum in Dearborn, Michigan; the Detroit Public Library; Albert Kahn Associates, Inc., in Detroit; the National Archives in College Park, Maryland; the San Francisco Labor Archives and Research Center; the Richmond Museum; and the Richmond Public Library. Jet Lowe produced the large format photography. Justine Christianson prepared the documentation for transmittal to the Library of Congress.

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Executive Summary

The Ford Motor Company assembly plant in Richmond, California, was one of that city's important sites of production in support of America's war effort during World War II. The assembly plant building stands today much as it did when Ford opened the plant in 1931, when Ford converted it to war-time production in 1942, when Ford reconverted it to production of civilian autos and trucks in 1945, and when Ford closed it in 1955. The building therefore holds considerable potential for interpreting the stories of American workers on the homefront during World War II. For that reason, the building will be one of the focal points in the National Park Service's new Rosie the Riveter World War II Homefront National Historical Park being developed in Richmond at the time of the writing of this report.

It is possible for observers to understand some industrial buildings or complexes in isolation. Operators of buildings received raw materials at one end, processed those materials within the building, and shipped finished products from the other end. Such was not the case with the Ford plant in Richmond, because before the war, during the war, and after the war, the building was part of a much larger technological system. To understand Ford's Richmond plant, then, observers must understand the transportation infrastructure that linked the building to other parts of the technological system and must understand the key operations that took place at other locations comprising the system.

The Ford Motor Company called its Richmond plant a branch plant, and it was one of many Ford branch plants throughout the U.S. and the world. Headquartered in Detroit (and later Dearborn), the Ford company manufactured most of its auto parts there, and in the early years assembled its autos there as well. Because it was more costly to ship fully assembled automobiles than it was to ship auto parts (auto parts can be packed in railroad cars or ships more densely than can assembled autos), the company soon established a practice of assembling its autos at plants throughout North America to supply a geographically vast market. The company initially shipped manufactured parts to assembly plants by rail, but in the 1920s Henry Ford grew increasingly interested in shipping parts by water as well. Therefore, when the company decided to build a new assembly plant in the San Francisco area, access to deep-water shipping was one of the site requirements, in addition to the conventional requirement of good rail access. The site chosen in Richmond had access to ocean shipping as well as to the Southern Pacific and the Santa Fe railroads.

The Richmond plant was designed to receive unassembled parts by ship or by railroad, either at the pier and craneway at the south end of the building or at the railroad spur along the east side of the building. Cranes and conveyors could then move parts to appropriate storage locations within the building. Other conveyors and sub-assembly lines within the building moved parts along the various sub-assembly processes. Finally, all sub-assemblies and remaining parts converged at appropriate points along the final assembly line, located along the west side of the building. Beginning as frames, then fully-assembled chassis, and finally cars, the autos moved from south to north along the final assembly line until they rolled off adjacent to the showrooms of the Richmond plant, located near the offices at the northwest corner of the building. From there, cars could either be displayed in the showrooms, driven to storage lots outside the plant, or placed on appropriate modes of transportation, whether trucks, rail cars, or ships. The Richmond branch plant was responsible for supplying autos to a network of Ford dealers throughout northern California and on the Hawaiian Islands. Other branch plants supplied market regions around the country and the world. Each branch plant had its own local managers, but they all took their orders from Branch Operations, part of the hierarchy of Ford's

headquarters in Dearborn.

In much the same way, the Richmond plant was part of a much larger technological system during World War II, under the command of the U.S. Army's Ordnance Department. Before the war, America's auto industry was dominated by Ford, General Motors, and Chrysler, but several other companies also held significant shares of the market. A plant like the Richmond branch was part of the Ford system; it assembled Ford products and only Ford products. During the war, however, virtually all of America's auto industry was mobilized in support of the war effort, so while the Richmond plant (now called the Richmond Tank Depot) was still owned by Ford, managed by Ford managers, and operated by Ford employees, it now processed tanks and other combat vehicles regardless of which company made them.

The Richmond Tank Depot served two basic functions during the war: 1) it assembled jeeps, much like it had earlier assembled cars and light trucks (although the process of assembling jeeps was less complicated because it was a simpler vehicle), and 2) it processed tanks and other combat vehicles and readied them to be shipped overseas to the various theatres of the war. In the former operation, the Richmond plant received Ford parts or other supplies to assemble jeeps that were identical to and interchangeable with jeeps being made by Willys. In the latter operation, the Richmond Tank Depot played a key, intermediate function between the factories where the vehicles were manufactured, and the Ports of Embarkation where the vehicles were placed on ships. When the factories made tanks and other combat vehicles, the vehicles were essentially ready to drive, but the factories did not outfit them with small arms, radios, or other items for which the U.S. Army retained responsibility. Nor did the factories prepare the vehicles to withstand the weather and other rigors of transport on the high seas. These tasks the army decided to do at its tank depots, of which it had three in the U.S. The army located its tank depots in leased industrial plants, and it contracted with private companies to operate them. Two of the tank depots (Richmond and Chester, Pennsylvania) were leased from and operated by the Ford company, and the third (Lima, Ohio) was owned by the government and operated under contract by General Motors. These three depots processed tanks and other combat vehicles, regardless of whether they were made by Cadillac or Chrysler or any of numerous other producers. Workers at the three depots installed small arms, radios and other communications equipment; they made modifications as necessary when vehicles were consigned to extremes of climate, like the Aleutian Islands or the desert of North Africa; and they coated critical surfaces in grease or otherwise prepared the vehicles for conditions on ocean-going freighters.

The management hierarchy at Richmond was more complex during the war. The Richmond Tank Depot was under the command of a U.S. Army Ordnance officer, who took his orders from the commander of the San Francisco Ordnance District (one of fourteen ordnance districts in the country). The San Francisco Ordnance District in turn took its orders from the Office of the Chief of Ordnance - Detroit (OCO-D), where the army had put its top Ordnance officer in charge of the procurement of combat and motor transport vehicles. (Prior to the war, all Ordnance activities had been run from Washington, DC, but command for the procurement of vehicles was moved to the center of the nation's auto industry during the war so that it could coordinate better with that industry.) Because the contracts (jeep and tank depot) were between the Ordnance Department and the Ford Motor Company, OCO-D communicated with Ford's Branch Operations in Dearborn, which then passed the communications along to its local managers (the same managers as before the war), who then gave orders to the Ford employees. Despite the fact that formal communications had to move from the local Ordnance commanding officer up through the Ordnance chain of command to OCO-D, over to Branch Operations, and down through Ford's chain of command to workers on the shop floor (or visa versa from Ford to

OCO-D), there was also a high level of cooperation between Ordnance and Ford workers at Richmond concerning matters for which such local communications were authorized.

Army employees working at the Richmond Tank Depot during the war included a small number of army officers and more than one hundred civilian Ordnance employees. There was also a small contingent of Signal Corps officers and employees serving under the commanding Ordnance officer. The Signal Corps was responsible for procuring and inspecting all of the army's communications equipment, including that installed in combat vehicles at the Richmond Tank Depot. Ford's local management staff remained in place during the war, and the shop-floor workers assembling jeeps or processing combat vehicles were Ford employees. By the time Ford entered those Ordnance contracts, its shop-floor workers were represented by Local No. 560 of the United Auto Workers of America (UAW).

In a nutshell, then, here is how the Richmond Tank Depot functioned as part of the larger national system of ordnance production during the war. In assembling jeeps, parts arrived via railcar from Dearborn and other suppliers (for example, Spicer Manufacturing Company of Toledo, Ohio, supplied the axles and transfer case for all of the four-wheel drive jeeps, whether made by Willys or Ford). Ford workers at Richmond off-loaded the parts and stored them at appropriate locations relative to the main assembly line along the west side of the first floor. After each jeep rolled off the line, a Ford worker took it for a 5-mile test drive before delivering it to Ordnance for inspection and acceptance. After acceptance, Ford workers took each jeep to the disassembly line where the wheels were taken off. The jeep was then prepared for boxing in wooden crates, which took place in a boxing shed located along the railroad spur on the east side of the building.

Combat vehicles arrived at the Richmond Tank Depot on railroad flatcars, delivered from manufacturers throughout the country. Because the rate at which manufacturers could deliver vehicles was not identical to the rate at which Ordnance received orders to deliver vehicles to the various Ports of Embarkation, many of the vehicles had to be stored on the lots adjacent to the Ford plant for considerable periods of time. As a consequence, numerous photographs exist of row upon row of tanks and other combat vehicles parked at Richmond. When Ordnance received orders for a particular number and kind of vehicles, the order would include specifications for how the vehicles should be equipped with small arms and communications gear and also for any modifications required in preparation for the particular front to which the vehicles would be shipped. Ford workers did all of the installations and modifications and then prepared the vehicles for shipment, which included coating surfaces with grease or fabric and sealing openings. Some of the work in processing vehicles took place inside the craneway or on the first floor of the plant, and some took place outside, weather permitting. Ordnance workers inspected the work all along the way. Some combat vehicles, such as scout cars, were broken down and boxed, like the jeeps, but most, like tanks, were placed on railroad flatcars or in boxcars for transport to Ports of Embarkation without being boxed. Although Ordnance Department records mention that some vehicles were loaded on ships from the dock at the south end of the Richmond Tank Depot, it appears that most vehicles were loaded on rail cars for transit to Ports of Embarkation elsewhere.

One of the special things the Richmond workers did in preparing vehicles for shipment was to place a bundle of recent magazines and newspapers in each tank or jeep so that soldiers on the front lines could read about the homefront. This activity was the idea of long-time Ford employee, Frank Vivian, and it was undertaken with the full support of Ford management. For the excellence of its work in processing combat vehicles during the war, the Richmond Tank

Depot received three Army-Navy, "E" Awards, the top award given by the U.S. military manufacturing facilities for excellence in support of the war effort.

As with homefront manufacturing facilities throughout the country, the Richmond Tank Depot employed a relatively large number of women during World War II. The percentage of African American employees at the Ford plant also increased during the war. As previously mentioned, shop-floor workers at the Richmond Tank Depot were represented by Local No. 560 of the UAW, thanks to a long period of organizing activity before the war by the UAW in the Bay Area and by the Ford employees themselves. The organizing drive featured a sit-down strike at the Richmond plant in 1937, fierce opposition by Henry Ford and his top managers, and an investigation by the National Labor Relations Board (NLRB), at the request of the UAW, into the Ford Motor Company's unfair labor practices at the Richmond plant. The NLRB ruled in the workers' favor, ordering Ford to rehire a number of workers with back pay. When the Richmond branch plant became the Richmond Tank Depot, both Ford labor and management turned their energies toward helping to ensure that the U.S. won the war.

With the war over in 1945, Ford reconverted the Richmond plant to the production of civilian cars and trucks. The plant continue to serve in that function within the Ford production system until 1955 when, because of the greatly expanded market for cars in California's post-war economy, the company decided to move its Bay Area operation to a larger site in Milpitas. The Ford Motor Company closed the Richmond plant that year.

CHAPTER ONE: INTRODUCTION

The Road ahead is dim with the dust of battles still unfought. How long that road is, no one can know. But it is shorter than it would have been had not our enemies misjudged us and themselves. For, when Hitler put his war on wheels he ran it straight down our alley. When he hitched his chariot to an internal combustion engine, he opened a new battle front--a front that we know well. It's called Detroit. *Lt. Gen. Brehon B. Somervell during a tour of Detroit's automotive industry in early 1942*¹

The former Ford Motor Company assembly plant at Richmond, California, is one of the cultural resources in Richmond that will house interpretive facilities for the Rosie the Riveter World War II Homefront National Historical Park, which is in development by the National Park Service. The Ford plant is historically significant because of its association with several individuals and historical developments important to the history of the United States, especially the mobilization of American industry for war production during World War II. The purpose of this history of Ford's Richmond plant is to provide a detailed overview of how the plant developed in the context of those themes and therefore to suggest themes of interpretation that may be deployed by the Rosie the Riveter park at the Ford plant.

The Ford plant is associated with Henry Ford and the Ford Motor Company. Ford is one of the most important American capitalists of the twentieth century. As a member of the "big three" in the U.S. automobile industry, his company helped shape one of the most influential technologies in American life, the automobile. Ford and his company developed the assembly line, a method of mass production that greatly altered the way Americans and much of the world now manufacture the material culture of modern society. The Ford system, while headquartered in the Detroit area, embraced the entire country and indeed much of the world through a network of branch assembly plants, of which the Richmond plant was one. Albert Kahn, the single most important American architect associated with factory buildings, designed the Richmond plant. The Ford system also greatly altered the work lives of the people employed by it. Their responses, both individually and as groups, especially by means of labor unions, is one of the major stories in the history of the American people during the twentieth century. Workers at the Richmond plant were an integral part of that story through their organization of Local No. 560 of the United Auto Workers of America. The activities of industrial plants (giant corporations and small producers alike), of rank-and-file industrial workers, and of systems of mass production all came together during World War II as parts of yet another large-scale technological system, the mobilization of America's industrial prowess to produce the weapons, vehicles, and supplies needed by the United States and its Allies to emerge victorious from the most terrible war the world has known.

Although all of the assembly line and associated equipment are long gone, the Ford plant itself was virtually intact at the time the author commenced research for this report. A developer, however, had begun construction to adapt the building to new uses. Redevelopment plans call for certain changes to the building. A section of this report, "The Building, Then and Now" in Chapter III, describes the building as it stood in 1931 and in 2003, just as the redevelopment was commencing.

¹ Quoted in Automotive Manufacturers Association, *Freedom's Arsenal: The Story of the Automotive Council for War Production* (Detroit: Automotive Manufacturers Association, 1950), v.

CHAPTER TWO: HISTORICAL CONTEXT FOR THE RICHMOND ASSEMBLY PLANT

Although this report is about the history of the Ford Motor Company's assembly plant at Richmond, California, it is necessary to begin with an overview history of Ford and its system of mass production since the Richmond plant was merely one component of a much larger technological system established by Ford to manufacture auto parts, assemble those parts into completed cars, and then distribute cars to a worldwide market. To be sure, the Richmond plant housed its own assembly line, a component in the system of mass production for which Ford engineers in Detroit receive much credit. The Richmond plant did not produce its own parts, relying instead on Ford factories in Detroit, Dearborn, and elsewhere. Ford managed its system, including the Richmond plant, from Dearborn. When the Richmond plant closed in 1955, it was because Ford decided the northern California market required a larger assembly plant, a plant Ford decided to build in Milpitas. To help the reader understand the history of operations at Ford's Richmond plant, then, a brief overview of the evolution of the Ford system follows.

A. Ford Motor Company & Mass Production

The history of the Ford Motor Company has been amply examined by scholars for many reasons, including: Henry Ford is one of the most prominent capitalists in American history; the Ford Motor Company is one of the "Big Three" auto companies (along with General Motors and Chrysler) and therefore emblematic of one of America's quintessential industries; and Ford and his engineers helped pioneer the assembly line, one of the most important manufacturing methods to grow out of and then help shape the industrial age.² A complete history of the Ford Motor Company is beyond the scope of this report; a few salient facts concerning its early years will suffice.

Henry Ford incorporated his Ford Motor Company in June 1903. The new company took over the assets of a limited partnership Ford had formed the previous year with Alexander Y. Malcomson. Ford provided the mechanical skills and Malcomson the initial capital for a partnership that would produce passenger vehicles powered by internal-combustion engines. Because he had already tried twice to develop a successful automobile business, Ford had a design for a car and a plan for how to assemble it at the shop he and Malcomson had rented. He intended to rely on others to make most of the components. Ford & Malcomson contracted with

² Perhaps the most well-known and extensive history of Ford and his company is the three-volume work by Allan Nevins and Frank Ernest Hill, *Ford: The Times, The Man, The Company* (New York: Charles Scribner's Sons, 1954); *Ford: Expansion and Challenge, 1915-1933* (New York: Charles Scribner's Sons, 1957); and *Ford: Decline and Rebirth, 1933-1962* (Charles Scribner's Sons, 1962). Perhaps the most important assessment of Ford's contributions to the development of mass-production technologies is David Hounshell's chapter, "The Ford Motor Company and the Rise of Mass Production in America," in *From the American System to Mass Production, 1800-1932: The Development of Manufacturing Technology in the United States* (Baltimore: The Johns Hopkins University Press, 1984). This being the centennial year (2002) of the Ford Motor Company, numerous books and articles have been published or will be published. Noteworthy among the books are: Russ Banham and Paul Newman, *The Ford Century: Ford Motor Company and the Innovations that Shaped the World* (New York: Artisan Books, 2002), and Douglas Brinkley, *Wheels for the World: Henry Ford, His Company, and a Century of Progress, 1903-2003* (New York: Viking, 2003), a gorgeous coffee-table book and a scholarly treatment, respectively. An excellent photographic history of the automobile assembly line is Byron Olsen and Joseph Cabadas, *The American Auto Factory* (St. Paul, MN: MBI Publishing Company, 2002).

the Dodge Brothers (John and Horace, founders of the auto company that would eventually become part of Chrysler) to manufacture 650 chassis, consisting of engine, transmission, and axles; they contracted with the C.R. Wilson Carriage Company for wooden bodies; and they secured additional components from other suppliers. As the partnership moved into production, they incorporated the Ford Motor Company so that they could enlist other investors as stockholders and thereby raise the capital necessary to actually assemble the planned 650 automobiles. Barely staying ahead of creditors thanks to James Couzens, an assistant who worked for Malcomson, Ford was able to produce the autos and sell them, setting the stage for placing a new set of orders to suppliers for a modified 1904 model and, more significantly, the Ford Motor Company's development into one of the important innovators of the early automobile industry.³

In the process of building his first few models of medium-priced cars, and in the context of an automobile industry that had yet to prove where it was heading, Ford became convinced that there was a huge market in the U.S. for an inexpensive car that was light-weight but of high quality, and that was powerful but did not require great mechanical skill to operate. As he continued building the other models, he devoted a portion of his Detroit factory to developing a new kind of car that he believed would satisfy the market he perceived. He introduced that car, the Model T, in 1908. Meanwhile, he had moved his factory from a rented space to a building built by the Ford Motor Company on Piquette Avenue in Detroit to assemble autos. The assembly process involved teams of men working at a variety of stations, each dedicated to assembling a particular sub-assembly and surrounded by piles of parts supplied by others. In 1905, Ford and Couzens formed the Ford Manufacturing Company, both as a means of wresting control of the Ford Motor Company from the other investors and of producing parts for Ford cars. For the latter purpose, the Ford Manufacturing Company rented a separate factory and hired new employees, among whom was a group of mechanics who had the skill and acumen to work with Ford in moving the enterprise toward the principles of mass production. Those principles initially involved an emphasis on interchangeable parts and arranging machine tools according to the sequence by which parts were produced (rather than by arranging all the machine tools of a particular part in a given room).⁴

After the two Ford companies consolidated in 1907 and Ford enlarged the Piquette Avenue plant, the entire operation moved back from rented space. The Model T proved immensely popular, and it was soon clear to Ford and his engineers that the Piquette Avenue plant was inadequate for producing ever greater numbers of the low-cost automobiles with the efficiencies necessary to keep costs down. The Ford Motor Company therefore decided in 1908 to build an entirely new factory in the Highland Park section of Detroit. Detroit architect Albert Kahn designed the building (see section below on Kahn). Ford gave the responsibilities of laying out the production scheme of the new plant to two of his top mechanic-engineers, P.E. Martin and Charles Sorensen, who had gained valuable experience laying out the production process for the Model T at the Piquette Avenue plant. Their task for the Highland Park plant became simpler in 1909 when Ford decided that his company would cease producing its other models and focus solely on the Model T. Now, each machine placed in the plant could be dedicated to a single purpose, and the engineers could locate it and its companion machines in a configuration that

³ Nevins, *Ford: The Times, The Man, The Company*, 219, 225-243; Hounshell, *From the American System to Mass Production*, 218.

⁴ Hounshell, *From the American System to Mass Production*, 218-222.

yielded as efficient a process as they could devise. Highland Park opened in 1910, and over the next few years Sorensen and Martin worked at refining the layout and the process.⁵ The plant quickly became a marvel, described in considerable detail in a series of articles published in the *American Machinist* in 1913 and in *Engineering Magazine* in 1914 and 1915.⁶

In 1913, the Ford Motor Company manufactured nearly 200,000 cars, more than half of the automobile production in the U.S. Fred Colvin, author of the *American Machinist* series, wrote that Ford could produce a Model T every forty seconds because the company's engineers focused on "principles of power, accuracy, economy, system, continuity, and speed."⁷ One element of the famous Ford system was still missing: the assembly line. Ford workers were still completing the final assembly of automobiles by moving in crews from one chassis to the next, each of which sat fixed on a wooden stand. Other workers delivered parts to the assembly stations. The Highland Park plant used the same method for assembling individual components, like engines. In 1913, however, Ford engineers began experimenting with the assembly-line concept, precursors of which existed elsewhere in American industry. For example, Henry Ford is well-known for attributing the germ of the idea to the disassembly process used by Chicago meatpackers. Ford engineers also credited the flour-milling and brewing industries. Additionally, the Westinghouse Airbrake Company had used a conveyor system as early as 1890 to move molds into position to receive poured cast iron and then move them on to the position where they were broken open. Indeed, the first conveyor used in a production process at Highland Park was in the foundry department, which made cast auto parts. In 1913, Ford engineers quickly began installing conveyors and assembly lines in other departments of the plant (radiator, magneto). All were intended to make the process more efficient by keeping the workers stationary while repeatedly performing the same task as the assembly or sub-assembly moved past.⁸

As 1913 unfolded, Ford engineers installed the assembly-line process in the transmission department and the engine department, the latter requiring sub-assembly lines moving toward the main line, much like tributaries flowing into a river. While some conveyors moved the assemblies along, other conveyors constantly moved parts into position so that workers could install the parts without having to fetch them. By the end of the year, Sorensen had begun installing an assembly line for the chassis. This entailed the final assembly, when all the parts, engine, transmission, body and fenders, and lights and final fittings, were installed to create a finished car. This was the line that was the most impressive and therefore came to be understood

⁵ Hounshell, *From the American System to Mass Production*, 224-228.

⁶ Fred Colvin wrote the series in *American Machinist* which appeared as sixteen articles in volumes 38 and 39 between 8 May and 27 November 1913. Horace Lucien Arnold began the series in *Engineering Magazine* in 1914 (vol. 18), but he died in January 1915 before completing it. Fay Leone Faurote wrote the remaining articles that year (vol. 19). All sixteen articles are collected in a single volume: Arnold and Faurote, *Ford Methods and the Ford Shops* (New York: The Engineering Magazine, 1919).

⁷ The quote is from Henry Ford's entry on "mass production" in the 1926 edition of *Encyclopaedia Britannica* as quoted in Hounshell, *From the American System to Mass Production*, 228. See also Colvin, "Building an Automobile Every 40 Seconds," *American Machinist* 38 (8 May 1913): 757-762.

⁸ Hounshell, *From the American System to Mass Production*, 228-248.

by the public as "the assembly line."⁹

The assembly line may have been a marvel for journalists and the public to behold, but it was a serious annoyance for production workers. Previously, workers or teams of workers had been paid by the piece and set the pace of their own work, but now a machine (the conveyor) that had the speed set by Ford engineers dictated the pace. Moreover, there previously had been a modicum of variety to each worker's day as he moved from station to station, installing a variety of parts. Now each worker stood in one place, repeating the same minute task throughout the shift. Such repeated motion was physically taxing, so Ford engineers tried to adjust the heights at which work took place to relieve sore backs and other complaints. Alleviating the physical problems could not remedy another: boredom. The turnover rate among production workers at Highland Park skyrocketed, and word circulated that Ford employees might organize into unions, a possibility that was anathema to Henry Ford. Thus, in January 1914, Ford implemented a huge raise in pay, more than doubling the base rate to \$5.00 per day. Such high pay for industrial workers induced many to force themselves to endure the grinding hardships of assembly-line work. The pay-raise was also a public-relations coup for the company, its owner, and the Model T, all three rising to mythical status in early-twentieth-century American culture.¹⁰

The Model T had a tremendous influence on American life. The process by which Ford produced the car influenced the development of the means of production in other industries. The Model T's low cost made automobile transportation available to all but the poorest Americans, reducing isolation in rural areas. The popularity of the Model T also stimulated a demand for improved roads. The increase in automobile use was a huge stimulus to the petroleum industry.¹¹ All those developments, though, eventually moved the nation beyond the Ford Motor Company, and the company had trouble responding to the change. It seems that the Ford system of manufacture was efficient, but not initially flexible. Whereas Ford continued to tinker with the production system to keep cutting costs, the company did not change the car. Other auto companies, most notably Chevrolet, found new ways to compete. Competitors devised improvements in comfort and performance and found ways to add those improvements to cars without having to charge much more than the price of a Ford. In 1927, after nearly twenty years, Ford finally discontinued the Model T and introduced the Model A. Ford had sold 1,112,000 cars in 1926 but only 390,000 in 1927. For those same years, Chevrolet's sales increased from 475,000 cars to 642,000. Ford's precipitous drop in production was due to the disruption in production schedules caused by the necessary overhaul of its worldwide manufacturing system to make the new model. Machine tools had to be changed and assembly lines altered. Ford sales eventually recovered, rising to 481,000 in 1928 and 1,310,000 in 1929, but that two-year drought was devastating to Ford dealerships.¹²

⁹ Hounshell, *From the American System to Mass Production*, 248-249.

¹⁰ Hounshell, *From the American System to Mass Production*, 249-261.

¹¹ Just two of many texts that analyze the influence of the Model T on American life are James J. Flink, *The Car Culture* (Cambridge, MA: The MIT Press, 1975) and Ruth Schwartz Cowan, *A Social History of American Technology* (New York: Oxford University Press, 1997), 156-159, 224-248.

¹² Nevins and Hill, *Ford: Expansion and Challenge*, 409-458; "Mr. Ford Doesn't Care," *Fortune* 8 (December 1933): 66-67.

Ford's market recovery came just as the world economy went into the Great Depression. By that time, Ford's production empire had expanded far beyond Detroit, as his engineers had devised a scheme by which the assembly-line process could embrace geographical space. That scheme was the system of branch assembly plants, of which the Richmond branch was one.

B. Ford's System of Branch Assembly Plants

From the beginning, the Ford Motor Company had relied on a network of sales agencies--dealers who agreed to sell Model T cars, stock parts, and provide mechanics' services. Ford initially manufactured fully assembled cars in Detroit and then "knocked them down" (took off the wheels and otherwise prepared them for shipment) before shipping them to dealers around the country. The agents in distant cities reassembled the knocked-down cars before placing them in showrooms. To better serve the network of sales dealerships, Ford took direct control of agencies in New York and Philadelphia in 1905 and the following year established company-owned branches in Boston, Buffalo, Cleveland, Chicago, St. Louis, and Kansas City. Ford branches not only delivered reassembled cars to dealerships within their respective regions, but also they sold Ford cars themselves. In 1914, when Ford sold over 200,000 autos, the company's twenty-nine branches accounted for 80 percent of sales. Not surprisingly, branch managers were closely supervised by Ford headquarters in Detroit. As Ford sales throughout the U.S. continued to increase, the company terminated its leases for branch buildings and built its own, usually designed by Albert Kahn.¹³

Almost as soon as the Ford Motor Company started selling cars in the U.S., it began forging relationships with foreign companies to assemble and sell Fords abroad as well. Ford's first deal with a foreign manufacturer was with Gordon McGregor, an Ontario wagon maker and the founder of the Ford Motor Company of Canada. McGregor signed a contract with Ford whereby he would give stockholders of the Detroit-based Ford company 51 percent of the stock in his new company in exchange for Ford granting him plans and specifications for the various Ford cars, technical assistance in producing them, and exclusive rights to make and sell Ford cars throughout Canada and the other British colonies. McGregor began making cars at his Walkerville Wagon Works across the Detroit River from Detroit and finished his first Ford in February 1905. At about the same time, Percival L.D. Perry of Birmingham, England, began negotiations with the Ford Motor Company to gain exclusive rights to sell or distribute Ford autos in England. Having secured that deal, he then began negotiating with the Ford organization to establish an actual branch operation in England. That branch opened in London in 1908, and Perry was soon managing a brisk business distributing Fords throughout Europe.¹⁴

By 1914, Ford had also expanded the scope of work assigned to some of the branches by having them assemble autos from unassembled parts supplied by Highland Park. The company opened its first such plant in 1910 at Kansas City. Later that year, it opened a second branch assembly plant at Fargo, North Dakota. One of the advantages of assembling autos elsewhere was in reduced shipping rates. Whereas a standard railroad boxcar of the time could hold only

¹³ Nevins, *Ford: The Times, The Man, The Company*, 249-250, 263-265, 344-347; Gerald T. Bloomfield, "A Geography of the Ford Branch Distribution System, 1904-1933," in *Roadside America: The Automobile in Design and Culture*, ed. Jan Jennings (Ames: Iowa State University Press, 1990), 40-43.

¹⁴ Nevins, *Ford: The Times, The Man, The Company*, 357-362.

three or four knocked-down Model T cars, it could hold the parts and sub-assemblies of twelve cars. This not only reduced freight rates but also reduced railroad congestion around the Highland Park plant. By 1914, fifteen of Ford's twenty-nine branches were branch assembly plants housing the usual showroom on the first floor and stock parts storage as well as an automobile assembly line modeled on the Highland Park plan on the floors above. The fifteen branch assembly plants were responsible for producing about a quarter of the company's total output of more than 200,000 cars. As Ford continued building branch assembly plants through the 1910s, its output continued to grow. Whereas the average Ford branch plant assembled about ten cars per day in 1914, that average increased to about seventy cars per day in 1917. That year, Ford's largest branch plant, Chicago, assembled more than 150 cars per day. The Ford system of branch plants was so successful that the company's competitors soon adopted the practice. Chevrolet, for example, established four branch assembly plants in 1915-1916 at strategic locations around the U.S., including one at Oakland.¹⁵

The Ford Motor Company's presence in the San Francisco Bay Area mirrored the company's national pattern of first establishing a branch agency and then a branch assembly plant. Ford's first San Francisco branch, located at Van Ness Avenue and Fell Street, opened in 1911. It received cars assembled in Detroit that had been knocked down for shipment by rail. Mechanics at the San Francisco branch put wheels back on the cars and readied them for sale at the branch or for delivery to dealers elsewhere in the area. In 1912, branch manager J.B. Lund hired Clarence Bulwinkel, a San Francisco native and recent graduate of Lowell High School, to work in the tool and stock department with the promise to move into an office job when an opening occurred. Shortly thereafter, Bulwinkel accepted a job as bookkeeper in the branch office. At about that time, the Ford Motor Company was making plans to build an assembly plant in San Francisco. Officials selected a site at Harrison and 21st Street, built a new five-story building, and hired local workers with no prior experience on automobile assembly lines. The new assembly plant was typical of Ford branch plants of the 1910s: they were multi-storied and located along railroad tracks in the heart of the city, where they could serve as both assembly plants and sales branches. All manufactured car parts and components arrived from Detroit by rail. The new San Francisco branch assembly plant ran its first Ford car off the line in late 1913.¹⁶

The company next decided to install an assembly line at the 1915 Panama Pacific International Exposition in San Francisco. Frank Vivian, who later would become important in the World War II activities at the Richmond plant, was placed in charge of the special exhibit in which Ford cars were assembled in public view and made available to car dealers waiting at the end of the line. Shortly after the exhibition ended, the San Francisco branch plant ceased selling cars directly and began serving only as an assembly plant and as a wholesale outlet for dealerships elsewhere. Bulwinkel worked his way up the Ford organization in San Francisco to the position of assistant manager before being transferred to Portland, Oregon, in 1926 to manage the branch plant there. He was transferred back to take over the San Francisco plant as manager in 1930, about the time construction of the new Richmond plant began (described in detail in the

¹⁵ Bloomfield, "A Geography of the Ford Branch Distribution System," 43-45, 49.

¹⁶ "The Reminiscences of Mr. Clarence Bulwinkel," Oral History conducted by Owen Bombard and dated 9 June 1952, Research Center, Henry Ford Museum, Dearborn, MI (hereafter cited as HFM) Acc. No. 65, 1-5, 12-13, 26; "The Reminiscences of Mr. B.R. Brown," Oral History conducted by the Oral History Section of the Ford Motor Company and dated February-May 1955, HFM Acc. No. 65, 12-13.

following section). The San Francisco plant was producing about 200 cars per day in 1930, but by then it had grown relatively inefficient. As a multi-story building, it relied on elevators to move components and partially assembled vehicles from floor to floor. The freight elevators had been designed for the Model T, but by 1930 Ford was producing the Model A. Therefore, very little of the equipment from the San Francisco plant was moved to Richmond.¹⁷

Ford's branches overseas also made the transition to assembly. The first non-North American Ford assembly plant was opened by Percival Perry at Manchester, England, in 1911. The company expanded into the southern hemisphere by opening an assembly plant in Buenos Aires in 1914. During World War I, Canadian-made Fords served as ambulances for Canadian troops, British-made Fords carried ammunition, and American-made Fords accomplished many tasks for Americans. To meet the growing post-war market, Ford opened two new assembly plants, one in Copenhagen and one in Cadiz. By 1924, Ford had opened assembly plants at Trieste, Antwerp, and Stockholm. The company replaced its Copenhagen plant with a larger waterfront structure in 1924 as well, because Copenhagen was to serve as Ford's gateway to Russia and the Baltic countries. In 1925, Ford opened an assembly plant in a suburb of Paris and the following year a plant in Berlin. Meanwhile, Ford of Canada paralleled the growth of its parent in the U.S., adopting the five-dollar day and expanding across the country, opening branches in Montreal, Toronto, Winnipeg, Regina, Calgary, and Vancouver. Farther south, the Ford Motor Company opened assembly plants in Brazil and Mexico. Ford entered the Asian market in 1922, building an assembly plant at Yokohama, Japan.¹⁸

The Ford Motor Company made the shift from multi-story to single-story branch assembly plants in the early 1920s following the huge River Rouge plant development in the Detroit area. Located in Dearborn, the new plant had several advantages over Highland Park, which was fast becoming inadequate during the late 1910s. The undeveloped site along the Rouge River was vast, which would allow for continuing expansion. The river would afford Ford the option of shipping materials to the plant by water as well as by rail. The potential of the site inspired Henry Ford and his engineers to think big, so they planned a new facility that would allow the company to start with raw materials and make nearly everything needed to assemble new cars. The Rouge plant would receive iron ore, coal, and limestone to smelt iron and then make steel. It would receive raw rubber and make tires. Building a new plant at the Rouge site also allowed the company to construct factory buildings designed by Albert Kahn to accommodate flows of materials and parts through the processes of fabrication and assembly newly configured according to the engineers' experiences in fine-tuning the processes at Highland Park. Construction began in 1918, portions of the plant began operating in early 1920, and by November the River Rouge assembly line was rolling out 800 cars per day.¹⁹ The Rouge plant became the next of Henry Ford's marvels as it produced finished cars as well as millions of

¹⁷ "The Reminiscences of Clarence Bulwinkel," 6-13, 18-20, 26-27.

¹⁸ *The Ford Industries: Facts About the Ford Motor Company and Its Subsidiaries* (Detroit: Ford Motor Company, 1924), 135, 141; Nevins, *Ford: The Times, The Man, The Company*, 355-360, 371-378.

¹⁹ Nevins and Hill, *Ford: Expansion and Challenge*, 200-210.

parts to be shipped to the company's network of branch assembly plants.²⁰

With the River Rouge plant operating, the Ford Motor Company turned its attention to up-grading its network of branch assembly plants, replacing many of the old multi-story facilities with new one-story structures, again designed by Albert Kahn. The New Orleans assembly plant that opened in 1923 was the first of this new generation of branch plants, which eventually came to include the Richmond plant.²¹

Ford's scheme for expanding its continental system of assembly plants included a component featuring water transportation. Since 1917, Henry Ford had dictated that new branch plants be accessible at least by barge. With the opening of the Rouge plant, Ford started accumulating a fleet of Great Lakes freighters for transporting coal and iron ore to his coke ovens and blast furnaces. He also developed a fleet of ocean-going vessels for shipping Ford parts to the foreign assembly plants. Toward the end of the 1920s, he turned his attention to delivering parts to domestic branch plants via ocean-going ships. The company planned to transport parts manufactured at the River Rouge plant via the Great Lakes and the New York State Barge Canal to ports along the Atlantic Coast or through the Panama Canal to the Pacific Coast. The assembly plant at Edgewater, New Jersey, was the largest of the new facilities built on deep-water locations. Three new plants on the Pacific Coast would be at Long Beach, Richmond, and Seattle, each with docking facilities. Ford launched two new 300' cargo ships in 1931, the EDGEWATER and the CHESTER, each with a net capacity of 2,800 tons. They were said to be the largest ships designed to fit through the New York State Barge Canal and were equipped with folding funnels and masts and retractable pilot houses that would allow them to pass beneath bridges over the canal.²²

When the Ford Motor Company decided in the 1920s to build its Richmond assembly plant, the plant would become just a component of the company's overall system, which was intended to realize the company policy to "manufacture near the source of supply and assemble near the point of distribution."²³ The system may be summarized as follows: The River Rouge plant received raw materials, many of which, like iron ore, coal, and limestone, came from the Great Lakes region. The Rouge plant had its own blast furnaces for smelting iron ore and its own coking ovens, which were also necessary for smelting iron. The foundry at the plant, said to be

²⁰ One example of the Rouge plant's notoriety is Edwin P. Norwood's *Ford Men and Methods* (Garden City, NY: Doubleday, Doran & Company, 1931). Norwood illustrated his text with the photos of Charles Sheeler, the well-known American painter and photographer who produced a significant series of art works depicting the Rouge plant. For an exquisitely produced publication of Sheeler's photos and paintings of the Rouge plant, see Theodore E. Stebbens, Jr. and Norman Keyes, Jr., *Charles Sheeler: The Photographs* (Boston: Museum of Fine Arts, 1987), and Carol Troyen and Erica E. Hirshler, *Charles Sheeler: Paintings and Drawings* (Boston: Museum of Fine Arts, 1987).

²¹ Nevins, *Ford: Decline and Rebirth*, 298; Bloomfield, "A Geography of the Ford Branch Distribution System," 45-46.

²² *The Ford Industries* (Dearborn, MI: Ford Motor Company, 1931), 48; "Ford Is Completing Third Coast Plant," *Automobile Topics* 103 (8 August 1931): 12; "1931: a Year of Progress in the Ford World," *Ford News* 12 (January 1932): 13; Bloomfield, "A Geography of the Ford Branch Distribution System," 46; Clare J. Snider and Michael W.R. Davis, *The Ford Fleet, 1923-1989* (Cleveland: Freshwater Press, Inc., 1994), 13-16, 34-35.

²³ *The Ford Industries* (1924), 32.

the world's largest, was close enough to the blast furnaces that the molten iron produced could be cast into such components as engine blocks without reheating. Additional departments stamped body parts from sheet steel, fashioned other parts of wood, and made glass from sand and then rolled the glass into sheets for windows and windshields. Ford still used the Highland Park plant to manufacture certain components, like radiators, Fordite (a hard rubber composition used for making steering wheel rims), roller bearings, textiles for upholstery, and batteries. All those parts and components were either sent to the "B" Building at the Rouge plant or were shipped throughout the network of thirty-one branch plants to be assembled into finished autos. During the course of a year, the Ford Motor Company used more than 500,000 freight cars to ship materials and parts and accrued about \$150,000,000 in transportation costs.²⁴

CHAPTER THREE: DESIGN, CONSTRUCTION, AND EARLY OPERATIONS

Once the Ford Motor Company decided to build a new plant in the San Francisco Bay area as part of its expanded system of branch assembly plants described in the previous chapter, several other factors influenced the development of the plant. There was the effort on the part of the City of Richmond, California, to develop its industrial infrastructure, and more particularly the effort by Fred Parr to lure the Ford Motor Company to Richmond. Once Ford decided to build at Richmond, two other streams of development converged along Richmond's waterfront: the experience of Ford's engineers in laying out automobile assembly lines and the masterful expertise of Albert Kahn and his architectural firm in designing factory buildings to house automobile assembly lines. This chapter describes those contexts and then provides a brief overview of the first decade of the Richmond plants operation. The chapter also features a description of the building as it was built and as it stands today. The physical description focuses in particular on stages in the process of assembling automobiles at Richmond, linking the present empty building to historic photographs and drawings depicting features of those stages of production.

A. Industrial Development in Richmond

Richmond, California, is located in Contra Costa County, on the east side of San Francisco Bay. In the nineteenth century, San Francisco developed on the peninsula that forms the south end of the Golden Gate, the entrance into the San Francisco Bay. Cities like Oakland, Berkeley, and Alameda (which are in Alameda County) grew up on the east side of the bay, becoming especially prominent with the completion of the transcontinental railroad in 1869.

²⁴ There are numerous descriptions of the Ford manufacturing system as it stood in about 1930; see *The Ford Industries* (1924); *The Ford Industries* (1931); *Mill & Factory* 18 (January 1936), special issue on Ford Production Methods, reprinted as Hartley W. Barclay, *Ford Production Methods* (New York: Harper & Brothers Publishers, 1936).

Contra Costa County is located north of Alameda County and south of the arm of the bay that is the mouth of the San Joaquin River. Prior to 1900, most of Contra Costa County was agricultural or undeveloped land. Much of the area that would become Richmond was farmland that had been Mexican land grants prior to 1848. There were a few small landings along the shoreline where farmers could ship their produce and where miners or merchants heading into the gold country could procure provisions. One of the most important of these was Ellis Landing, located at the north end of what is now Richmond's Harbor Channel.²⁵

In 1895, A.S. Macdonald acquired much of the Mexican land grant that is now Richmond. He began negotiating with the Santa Fe Railroad to establish a railroad and ferry terminal at Point Richmond that could provide a railroad link to San Francisco, arguing that it was closer than the terminals at Oakland or Alameda. The Santa Fe's new facility went into service in July 1900, spurring commercial growth near Point Richmond. Macdonald, however, intended the commercial center for the town he was developing to be a few miles inland. He platted commercial lots along his city's main east-west thoroughfare, named Macdonald Avenue, and platted residential lots around the core. Macdonald and other developers offered businesses and workers incentives, like housing and transportation, to locate near the area he intended to be the city's center. The City of Richmond incorporated in 1905. Municipal government was first located at Point Richmond, but it moved to new quarters in downtown Richmond in 1917.²⁶

At about the same time, developers began to more intensively undertake harbor improvements for Richmond. In 1905, H.C. Cutting purchased 400 acres of marshy land around the old Ellis Landing. He then formed the Point Richmond Canal and Land Company to cut a channel through the swamp toward the northwest, using material excavated from the channel to begin filling the swamp. That dredge cut has been improved over the years and is now known as the Santa Fe Channel. In 1910, the City of Richmond began working to help improve the harbor, securing the assistance of the federal Rivers and Harbors Committee to study the harbor while at the same time contracting with a San Francisco engineering firm to do so. Both studies were completed in 1912, and both recommended similar improvements, which formed the basis for the Inner Harbor as it exists today. There were to be three components that required dredging: 1) an entrance channel extending from deep water in the San Francisco Bay eastward along the south side of the Richmond peninsula to the north side of Brooks Island, 2) a rectangular basin running along the Richmond waterfront from Brooks Island to Point Isabel, and 3) a 600' wide channel extending from the entrance channel, adjacent to Brooks Island and Point Portrero, roughly northward to the vicinity of Ellis Landing. The latter channel is now called Ellis Channel or the Harbor Channel.²⁷

Congress did not authorize federal construction of the improvements until 1917. During

²⁵ David L. Felton, "The Industrial Heritage of the Richmond Inner Harbor Area: An Initial Inventory of Cultural Resources," unpublished cultural resources report dated 6 November 1979 and prepared for the Richmond Inner Harbor Port Redevelopment Project, City of Richmond, pp. 4-8; Shirley Ann Wilson Moore, *To Place Our Deeds: The African American Community in Richmond, California, 1910-1963* (Berkeley and Los Angeles: University of California Press, 2000), 8.

²⁶ Felton, "The Industrial Heritage of the Richmond Inner Harbor Area," 11-12; Moore, *To Place Our Deeds*, 8-9.

²⁷ Felton, "The Industrial Heritage of the Richmond Inner Harbor Area," 12-14.

the intervening five years, the municipal government and other local parties began paying for dredging to improve the Harbor Channel and for construction of bulkheads along the channel behind which to place the dredged fill. Federal dredging and filling lasted from 1917 to 1933, with new fill expanding the areas of improved ground on both sides of the channel during that period. By the early 1930s, there were several manufacturing and transportation facilities along the Inner Harbor, including two municipal shipping terminals (one equipped for handling sugar and one for handling general cargo), a few private docks, the Filice and Perrelli cannery, and the Ford Motor Company's Richmond assembly plant. The latter two facilities began operating in the early 1930s. They were in part the fruits of Fred Parr's efforts to promote the development of new land, created by dredge fill, for industrial development along the Inner Harbor's waterfront.²⁸

Fred Parr was born in 1885 on a ranch near Visalia, California. His father died when he was still a teen, so before he had completed high school his mother sent him to business school in San Francisco. After completing a course in business administration, he went to work as a bookkeeper in the San Francisco business, E.J. Dodge Company, of which former California governor J.N. Gillett was president. Noticing that most steam schooners delivering lumber to San Francisco from the Pacific Northwest returned empty, Parr started a business predicated on the improved rates he could obtain for cargo shipped on the schooners' return trips. He built his business during World War I into the Parr-McCormick Steamship Line, of which the E.J. Dodge Company was a major investor. At the same time, Parr became involved in developments on Oakland's inner harbor, working with the Corps of Engineers to accomplish some dredging for a deep-water channel, building a terminal to provide Oakland with steamship service, and participating in the political moves that led to the Port of Oakland and its governing commission being independent of the Oakland City Council.²⁹

Seeing what an effective operator Parr was, the Richmond Chamber of Commerce asked him to speak in Richmond about that city's potential for expanded harbor facilities. In response to his remarks, Richmond's mayor asked Parr to manage and operate the city's municipal docks, which were small and received little business. Parr proposed instead that he head the implementation of a comprehensive plan to expand Richmond's harbor facilities. Parr's plan featured his commitment to acquire 100 acres on the Richmond harbor, to coordinate efforts by the city to get the Corps of Engineers, finally, to dredge the channel to the Richmond harbor and make it suitable for ocean vessels, to fill waterfront areas and make them suitable for industrial development, to expand railroads, streets, and utilities into the harbor area, to lobby the legislature to allow cities to make lease agreements with fifty-year terms, and to bring industries of national scope to Richmond. In implementing the plan, he formed the Parr-Richmond Terminal Company, which built a large terminal facility in cooperation with the City of Richmond.³⁰

Parr secured the first of the promised national developments in 1926 when he read a

²⁸ Felton, "The Industrial Heritage of the Richmond Inner Harbor Area," 14-37; Marjorie Dobkin, "Filice and Perrelli Canning Company, Inc., Richmond, California: Historic Resource Evaluation Report," unpublished cultural resources report dated August 1998 and prepared for the STG Group, Santa Rosa, CA, pp. 7-9.

²⁹ "The Reminiscences of Mr. Fred D. Parr," Oral History conducted by Owen Bombard and dated 14 June 1952, HFM Acc. No. 65, 1-28.

³⁰ "The Reminiscences of Fred D. Parr," 28-32.

notice in a newspaper that Ford was looking for a site on which to build a new assembly plant in the Bay Area. He first contacted Charles Bulwinkel, Ford's assistant manager in San Francisco to learn the company's site requirements, which were: approximately 50 acres of land; entire lot in one parcel with no intervening streets; location on the waterfront with service by deep-water channel; service by both the Southern Pacific and the Santa Fe railroads; and streets, sewers, and public utilities serving entire lot. Ford wanted to have all of those improvements made to the site without cost to the company. Parr and Richmond mayor W. W. Scott traveled to Detroit to meet with company officials to assure them that the proposed site in Richmond would meet Ford's specifications. Parr had paid \$90,000 for the land, which included about 50 acres of dry land plus some property extending into the bay and channel. After convincing Ford company officials of the suitability of the site, he proposed a sale agreement. He asked for Ford to pay \$2,500 as a down payment. He would then make all the improvements necessary at no cost to Ford. When Ford was satisfied that the site was ready, he would pay Parr the balance of what he had paid. Parr asked that Ford pay interest on the balance until the transaction had been completed, but company officials informed him that Henry Ford never paid interest. According to Parr's account, he tried to secure some other means of payment from the company for the time during which he was carrying the price of the land, but Ford would not compromise. Wanting to secure the deal, Parr agreed to Ford's terms.³¹

Even though Parr had sold land on the east side of the Ellis Channel to Ford in 1926, that company had not yet built its new plant in 1929 when Parr sold another parcel of reclaimed land to the Filice and Perrelli Canning Company. Gennaro Filice and John Perrelli had emigrated to California from Italy in 1908. They and members of their families worked in canneries near San Jose and Gilroy until 1914, when they formed their own business to grow and can tomatoes. The next year, they leased a small cannery at Gilroy, and they incorporated the Filice and Perrelli Canning Company in 1918. They leased another cannery in San Jose in the 1920s. Near the end of the decade, they bought land in Oakland on which to build their own facility, but then Fred Parr contacted them, offering to trade land in Richmond for the Oakland property. Filice and Perrelli made the swap early in 1929 and began building their new fruit cannery, which was ready to begin canning that year's crop. Filice and Perrelli canned cherries, peaches, apricots, plums, and figs, as well as fruit cocktail, a product developed by the University of California in the 1930s. Filice and Perrelli operated the cannery until they sold it to California Canners and Growers (Cal-Can), a growers cooperative who closed the cannery around 1970. The City of Richmond purchased the building for use as offices and warehousing.³²

B. Design & Construction of Richmond Plant

The Ford Motor Company's 1930 plans for expanding its system of branch assembly

³¹ "How Ford Came to Richmond," *Richmond United* (special issue of the Richmond Chamber of Commerce's monthly) 4 (August 1930): 3; "The Reminiscences of Fred D. Parr," 32-41; M. Wiesmyer, "Branch Operations - Richmond," preliminary draft report dated 26 April 1956, HFM Acc. No. 106, microfiche. The latter document includes several descriptions of the land owned by Ford at the Richmond plant, which vary from 47.84 to 50.76 acres for the area of dry land and from 58.57 to 73.71 acres for the total area, including water, within the property boundaries.

³² Felton, "The Industrial Heritage of the Richmond Inner Harbor Area," 33-37; Dobkin, "Filice and Perrelli Canning Company," 3-13.

plants around North America and elsewhere in the world would cost an estimated \$60,000,000. The plan included the construction of a new facility on the waterfront of San Francisco Bay. A tide water location would allow delivery of parts to the assembly plant and the delivery of finished autos to Pacific Coast ports, Hawaii, and foreign countries by ocean-going ships. As described above, the Ford Motor Company signed an agreement with Fred Parr in 1926 to purchase 72 acres on Richmond's Inner Harbor, giving the company access to shipment both by rail (the Southern Pacific and the Santa Fe) and by water. Ford did not begin construction, however, until 1930. The new plant would be capable of producing up to 400 cars per eight-hour shift, twice what Ford's existing San Francisco plant could assemble in a full day. To maintain that full production at the Richmond plant, though, an additional shift was necessary in the body shop. Employment at full production would be 2,600.³³

The Ford company awarded the contract to build the new Richmond plant in July 1930. Clinton Construction Company of San Francisco was the successful bidder for the \$3,500,000 contract. According to B.R. Brown, who had charge of awarding contracts, the Ford Motor Company usually tried to rely on local contractors. He also recalled that Ford did not always award contracts to the low bidder. Brown was confident enough in his ability to estimate costs that if he received a bid that was too low, he would award the contract to another bidder whose bid was more in line with his estimates. The Ford Motor Company always insisted on including a clause in the construction contract that assured the construction project would be an open shop, i.e., that the contractor would not discriminate between union and non-union workers.³⁴ City officials, delegates from neighboring cities, and many of Richmond's citizens celebrated the beginning of construction on July 30. Albert Kahn Associates of Detroit designed the shell of the building, but Ford's Power and Construction Department designed the layout of the automobile assembly equipment for the plant.

1. Ford's Department of Power & Construction

Although Albert Kahn has garnered much deserved attention for his designs of Ford Motor Company and other factory buildings, it is important to recognize that he designed envelopes around an assembly layout that took precedence over the building and that Ford officials were in charge of factory layout and design. The various tasks--plant layout, architectural design, as well as site selection and construction supervision--were the responsibility of an organization called Power and Construction. In the 1920s and the period during which the Richmond plant was designed and built, B.R. Brown was its head. Brown recalled:

³³"Ford Acquires Land on Coast," *Automobile Topics* 84 (18 December 1926): 522; "Ford to Rebuild on Coast," *Automobile Topics* 96 (18 January 1930): 1015; "Ford Is Completing Third Coast Plant," *Automobile Topics* 103 (8 August 1931): 12; "History of Richmond Branch," unpublished report dated 18 March 1941, HFM Acc. No. 429, box 2, Richmond, CA, folder. The acreage cited in the paragraph is from the earliest of the above-cited notes in *Automobile Topics* and almost certainly refers to the total area, including water, acquired by Ford.

³⁴"Ford Lets Plant Contract," *Automobile Topics* 98 (2 August 1930): 1031; "Local Contract Announcement Is Made," *Richmond United* 4 (August 1930): 3; "Celebration Marks Opening of Work on Big Plant," *Richmond United* 4 (August 1930): 5; "The Reminiscences of Clarence Bulwinkel," 26; "The Reminiscences of B.R. Brown," 24-25. In "The Reminiscences of B.R. Brown" (p. 8), Brown lists the cost of the Richmond branch plant as \$1,845,284, which is probably just the building itself, while Clinton Construction's total \$3,500,000 contract probably included site work, such as the dock.

I always conferred with them [the Manufacturing Department] before we began the plant plans. I insisted that the Layout Department give me a layout so the column spacings would be correct and so there would be no interference with the assembly lines, drying ovens and other installations. In other words, we built the buildings around their layouts rather than building the buildings and then putting the equipment in. We did that because I remember in one plant we built before I had seen the layout, we had trouble fitting the paint ovens into the plant.³⁵

Like so many of Ford's top officials at the time, Brown was not college educated. In fact, he did not even finish high school. Born in 1880 at Battle Creek, Michigan, he went to school there through the eleventh grade, after which he went to work in a local bicycle shop. Thereafter, he held a variety of jobs with employers who familiarized him with aspects of the construction business, including a plumber, a manufacturer of plumbing fixtures, a manufacturer of closet combinations, a lumber company, an electrical contractor, and a general contractor. In 1912, he took a job as clerk of the works for the W.E. Wood Company, which had a contract to build an addition to the Ford Motor Company's Highland Park plant. Brown's duties included accounting for all materials and labor used on the project. At the end of the project, Ford officials were so impressed that his figures on the \$1,500,000 contract coincided exactly with theirs that they offered him the job supervising the Ford Motor Company's construction program. Initially his work was limited to maintenance and expansion of Ford's existing Highland Park plant, but by 1922, when Ford embarked on a major expansion program, he had charge of the company's site selection, the preparation of plans and specifications, and awarding of construction contracts. During more than twenty-one years of service with the Ford company, he was responsible for the construction of nearly 13,000,000 square feet of space in the U.S. and abroad at a cost of about \$65,000,000. The 519,000 square feet of assembly plant at Richmond costing \$1,845,000 was a fraction of his aggregate accomplishment.³⁶

During the period when the Richmond branch was designed, the Ford organization in charge of designing the physical layout within plants or within departments was called the Factory Layout Department, of which M.L. Wiesmyer was a prominent designer. Born in 1899 at Whitmore Lake, Michigan, Wiesmyer grew up working for his father, a carpenter and contractor who built houses in the vicinities of Detroit and Ann Arbor. In 1918, shortly after graduating high school, Wiesmyer took a job as a machine hand at the Ford Motor Company's Highland Park plant. The following year, the Factory Layout Department selected Wiesmyer to work on plant design. Despite his lack of drafting experience, he was selected to make small templates representing pieces of equipment and then to try various arrangements of the equipment on floor plans in a effort to find an efficient layout. Initially, Wiesmyer worked on reconfiguring existing departments at various Ford plants around Detroit (but not the branches) either to make more room or because the department was moving to a new location. In preparation for a particular redesign job he would visit the department in question and interview the foreman. He would also investigate the possibility of installing conveyors or other labor-saving equipment. When he first started in factory layout, configuring equipment with an eye to efficient connection to overhead line shafts was still an important parameter shaping design.

³⁵ "The Reminiscences of B.R. Brown," 27.

³⁶ "The Reminiscences of B.R. Brown," 1-2, 8.

Wiesmyer was transferred to the Upholstery Department in 1921.³⁷

In 1922, about the time that the Factory Layout Department took charge of designing the layouts of branch assembly plants, Max Wiesmyer was transferred back to that department. At the same time, the Ford Motor Company embarked on a major expansion of its branch assembly system, and corporate officials decided the company would switch from building multi-story assembly plants to single-story structures. This was intended to make the assembly lines more efficient and also to facilitate alterations to the process necessitated by car-model changes. Whenever possible, plants were also to be built along navigable waterways. Wiesmyer and the Factory Layout Department developed several standard features for the new plants, eventually built in places like Chicago, Louisville, Chester, Edgewater, Charlotte, Dallas, and Memphis. Ford management gave the department a production target (e.g. 300 cars per day), and then they allocated 700 square feet of floor space per car per day. They also set 300' as the standard width of a new Ford branch assembly plant. Various volumes of production were therefore accommodated by varying the length of the design for a particular branch. Once the size and layout of the branch plant had been determined, the Layout Department passed the design on to the Power and Construction Department, headed by B.R. Brown. Power and Construction in turn passed the design project to the Albert Kahn firm, who designed the structure that would serve as the envelope for the plant layout. Actual construction of the building and installation of the assembly-line equipment was under the authority of the Power and Construction Department. Throughout the process of site selection, layout, and construction, Charles Sorensen played a prominent supervisory role.³⁸

The Richmond plant differed from the typical Ford plants of the 1920s. It was a two-story structure rather than one-story, and it had about 1,000 square feet per car per day rather than 700. In these aspects, Richmond was like the Buffalo and Seattle branch plants, designed and built at the same time (1930-1931). Each of the plants had its body department on the second floor. The Buffalo, Richmond, and Seattle group was the last major expansion built under B.R. Brown's supervision before he left the company in 1933. During construction of the Richmond plant, Brown made numerous trips to the Bay Area to check on construction. As was typical, Wiesmyer was responsible for the layout of the Richmond plant.³⁹

In his oral history, Wiesmyer tells an interesting story that reflects Sorensen's unquestioned authority within the Ford organization and, in particular, in the process of plant design. Wiesmyer, Brown, and others had been working on the layout of the Richmond design for some time, experimenting with various configurations that would address the site variables presented by waterfront, railroad track locations, etc. They were anxious to get Sorensen's approval of their proposed design before he left for a vacation in Florida. At a meeting in his office, they presented several design options, none of which he liked, so he sketched the configuration he wanted. Wiesmyer, who had been studying the problem for some time, interjected, "Mr. Sorensen, I think...." Sorensen cut Wiesmyer off, saying, "Well, who in the hell

³⁷ "The Reminiscences of Mr. M.L. Wiesmyer," Oral History conducted by Owen Bombard and dated 18 March 1953, HFM Acc. No. 65, 1-5, 8-13, 18-20.

³⁸ "The Reminiscences of M.L. Wiesmyer," 28, 31-39; "The Reminiscences of B.R. Brown," 25-27.

³⁹ "The Reminiscences of M.L. Wiesmyer," 54, 56-57; "The Reminiscences of B.R. Brown," 8-9; "The Reminiscences of Clarence Bulwinkel," 26; "The Reminiscences of Fred Parr," 43.

ever told you were supposed to think." Sorensen then left for his vacation, and Brown sent a re-oriented plant design, based on Sorensen's sketch, to Kahn's architects so they could design a building. When Sorensen returned from two weeks' vacation, however, he called for Wiesmyer and said, "You know, the more I get to thinking about the Richmond plant, the more I think maybe we ought to turn that building around and set it the other way." Contemplating the matter, Sorensen had come to realize that Wiesmyer and the others had recommended a configuration more appropriate to the site, so the Ford staff had to send a new layout to Kahn Associates and have the architects begin their design anew.⁴⁰

2. Albert Kahn

Kahn designed most of Ford's buildings during the first half of the twentieth century, including the expansion of the Highland Park plant, the River Rouge plant, and most of the branch assembly plants throughout the U.S. and abroad. There was a brief period in the 1910s when the Ford Motor Company hired John Graham, a Seattle architect, brought him to Detroit, and installed him in an architecture department at Highland Park to design several branch plants, including Seattle, Cambridge, Houston, Dallas, Columbus, Cincinnati, Atlanta, and Pittsburgh. Kahn was responsible for nearly all of the 1920s generation of branch assembly plants, including Richmond.⁴¹

Born in Germany in 1869, Albert Kahn was the oldest of eight children in the family of Rosalie and Joseph Kahn, an itinerant rabbi. By the time Albert Kahn was old enough for school, his family had moved to Luxembourg, where they lived until 1880, when they emigrated to the United States. The Kahns settled in Detroit. Rather than attend school, young Albert took a variety of jobs to help support the family. He also had a knack for drawing, so his parents encouraged him by buying him drawing materials and helping him find a job doing menial work, without pay, in a Detroit architectural office. That led at the age of 15 to drawing lessons and another non-paying job with the firm Mason & Rice. This time he was actually able to put his drawing skills to work. Kahn's skill at rendering and working drawings helped him garner paid responsibilities with the firm, and in 1888, at the age of 19, he was put in charge of designing and supervising construction for the firm's residential work. Two years later, the *American Architect and Building News* awarded him a travelling scholarship, which afforded him the opportunity to travel to Europe for a year of visiting architectural landmarks and meeting architects. As Grant Hildebrand observes in his biography of Albert Kahn, nothing in Kahn's early career suggested that he would eventually design buildings that were to become some of the icons of the Modern Era. Kahn's early, non-industrial work was conventionally derivative of historical European styles.⁴² When Kahn returned to Detroit in late 1891, Mason & Rice appointed him chief designer. He remained with the firm until 1896, during which time he became enamored of the work of McKim, Meade and White. In 1896, Kahn and two Cornell graduates left Mason & Rice

⁴⁰ "The Reminiscences of M.L. Wiesmyer," 54-56.

⁴¹ "The Reminiscences of B.R. Brown," 12.

⁴² Hildebrand, *Designing for Industry*, 21.

to form their own firm: Nettleton, Kahn and Trowbridge.⁴³

In 1897, Alexander Trowbridge left the year-old firm to become the head of the Department of Architecture at Cornell University. Kahn and George Nettleton continued their firm until 1900, when Nettleton died. That same year, Kahn designed his first industrial building for Joseph Boyer, a manufacturer of pneumatic hammers. With Nettleton and Trowbridge gone, Kahn remained the sole principle in the firm. To supplement his own skills, Kahn hired Ernest Wilby as chief designer in 1902 and made him an associate, and Kahn began to collaborate with his brother, Julius, a civil engineer who had graduated from the University of Michigan. The two brothers designed a new Engineering Building for the University of Michigan at Ann Arbor in 1902. In its construction, they used reinforced concrete, a new building material they were both interested in exploring. Julius also established the Trussed Concrete Steel Company in Detroit to produce steel reinforcing bars according to his own design. A third important event of 1902 occurred when Joseph Boyer introduced Kahn to Henry Joy, soon to head the Packard Motor Car Company. When Joy assumed Packard's presidency in 1903, he appointed Kahn its architect. Through Joy, Kahn's firm received several non-industrial commissions, but the most important work stemming from the connection with Joy was the design of factory buildings for the expanding Packard company.⁴⁴

During the years 1903-1905, the Kahn firm designed nine factory buildings for Packard, all of conventional mill construction. In 1905, though, Albert and Julius Kahn made an important breakthrough when they designed Packard Plant Building No. 10 of reinforced concrete. The new structural system allowed them to provide spacing between columns that was somewhat greater than in conventional mill construction. More significantly, the reinforced-concrete frame embedded in the perimeter walls left more space in the envelope for windows, enhancing the day-lighting of the interior work spaces. The structure was also fireproof. Although comparable to the pioneering work being done in reinforced-concrete industrial design by Ernest Ransome in California and the New York area, the Kahn design was a great improvement over the conventional industrial buildings being used by the automobile industry elsewhere in Detroit. Another feature of the Kahn design was perhaps equally important in attracting future clients in the automobile industry: Building No. 10 was asymmetrical, as Kahn set aside normal aesthetic considerations of the period and let the functional requirements of the plant dictate its overall form and shape. In this regard, Kahn exhibited a willingness to explore new areas in architectural design that did not appeal to his peers in the architectural profession.⁴⁵

Kahn's next set of industrial buildings was in Buffalo for George N. Pierce, maker of the Pierce Arrow car. Designed in 1906, the complex is important because it foreshadowed buildings that would become the norm in the auto industry a decade later. The Pierce buildings were one-story, very wide, and employed a saw-tooth roof to allow skylights to illuminate all of

⁴³ Hildebrand, *Designing for Industry*, 5-18; Federico Bucci, *Albert Kahn: Architect of Ford* (New York: Princeton Architectural Press, 2002), 27-28.

⁴⁴ Hildebrand, *Designing for Industry*, 25-28; Bucci, *Albert Kahn*, 29-31. On Boyer, see David A. Simmons, "'The Continuous Clatter': Practical Field Riveting," *IA: The Journal of the Society for Industrial Archeology* 23, no. 2 (1997): 5-20.

⁴⁵ Hildebrand, *Designing for Industry*, 28-34; Bucci, *Albert Kahn*, 31-35.

the broad interior space.⁴⁶

By the time the Ford Motor Company announced its intention in 1908 to build the Highland Park plant to manufacture the Model T, Albert Kahn's reputation was known to Ford officials because of the Packard plant, only a few miles from the Highland Park site. Some time after the company decided to build the plant, it selected Kahn as its architect, beginning a long relationship between Kahn and Henry Ford. Although there must have been many fascinating facets to their relationship, two stand out. First, both men had risen to prominence in their respective fields without much formal education. Ford is known to have disliked the pretenses he believed some educated people exhibited, and those pretenses would have been absent in Kahn, who shared the feeling. In fact, during the 1920s and until 1935, Kahn did not hire a single person with an architectural degree, believing such a person's desire for self-expression was not compatible with the cooperative team he had assembled in his office. Second, Ford was a notorious anti-Semite, even going to far as to publish anti-Jewish diatribes in his weekly newspaper, the *Dearborn Independent*, which he bought in 1918. Yet despite the fact that Kahn was a Jew, neither man terminated the relationship. One thing that certainly must have enamored Ford of Kahn was Kahn's oft-repeated adage: "Architecture is 90% business and 10% art."⁴⁷

The Highland Park plant was very similar to Kahn's Packard plant and not much like the Pierce plant in Buffalo. The original building was of reinforced concrete, four stories tall, 860' long, and 75' wide, with a row of columns extending along the building's central axis. Later additions, such as power plant, offices, machine shop, and another multi-story factory building, made the Highland Park complex immense. Edward Gray, a Ford engineer, contributed much to the design of the additions. Two features were fundamental to the design of Highland Park: efficient flow of materials was paramount to the configuration of buildings and spaces, and effective daylighting increased workers' productivity within the buildings.⁴⁸

While Kahn and his office worked on Highland Park, they also continued to work on expanding the Packard plant and designing industrial buildings for other firms, like Dodge Brothers, Hudson, and Continental in the auto industry and B.F. Goodrich Rubber Company and Joseph Mack Printing in other sectors. In 1910, Kahn's brother Louis joined the firm. By 1918, eighty people worked in the office. Ernest Wilby remained with the Kahn firm until 1922.⁴⁹

The River Rouge plant, which marked a new turn in the operations of the Ford Motor Company, also marked a turn in the kinds of factories Kahn designed. Prior to the Rouge plant, most of Kahn's factory buildings had been multi-storied reinforced-concrete structures; after Rouge, most were single-storied steel-frame structures. Kahn was already experienced with steel frames. He had used the system in 1904 when designing a single-story building with sawtooth

⁴⁶ Hildebrand, *Designing for Industry*, 34-43; Bucci, *Albert Kahn*, 35-36.

⁴⁷ Kahn quoted in Bucci, *Albert Kahn*, 37; see also, Hildebrand, *Designing for Industry*, 43-44, 127; Nevins and Hill, *Ford: Decline and Rebirth*, 124-129, 311-322; David L. Lewis, "Ford and Kahn," *Michigan History* (September/October 1980): 26-27. Lewis (p. 17) describes Ford asking Kahn to design Highland Park in 1907, but Lewis offers no citations for his version of the initial meeting between Ford and Kahn.

⁴⁸ Hildebrand, *Designing for Industry*, 44-54; Bucci, *Albert Kahn*, 38-44.

⁴⁹ Hildebrand, *Designing for Industry*, 54-61.

roof for the Burroughs Adding Machine Company in Detroit, and he used a steel frame for a machine shop at Highland Park and for Packard's forge shop. None of those buildings came close to the scale of the plant Kahn designed for Ford at the Rouge site in 1918. The first use of the original Rouge building was not to assemble automobiles but rather submarine chasers. Henry Ford had convinced the government that he could mass-produce submarine chasers, called Eagle boats, using the same principles he used to make the Model T. The government agreed to finance construction of the building in early 1918, and Kahn proceeded to design a building 1,700' long and 255' wide. The building was ready for operations in May 1918, and Ford launched its first Eagle boat in July. After the war, the company converted the building, designated "B" Building in the River Rouge complex, for use in assembling Model T cars and Fordson tractors. Kahn also designed the other buildings at the Rouge plant, which grew in the ensuing years to the gigantic proportions described in a previous section of this report.⁵⁰

In addition to the Rouge plant, Kahn designed thirty-five of the branch assembly plants that were part of the Ford expansion of the 1920s. Ford was not Kahn's only client. He also designed major projects for Studebaker, Fisher Body, Chrysler, Chalmers Motor Company, Plymouth, and the Glenn L. Martin Company. The latter client was his first in the aircraft industry. Throughout this period, Kahn continued to design non-industrial buildings as well, notably the General Motors Building and the Fisher Building in Detroit and the William L. Clements Memorial Library at the University of Michigan. Kahn's non-industrial buildings are beautiful structures and impeccably detailed, but they also demonstrate that as a commercial architect he remained entirely conventional and derivative.⁵¹ By 1929, the Kahn firm had designed more than fifty major factories and had grown to more than 400 employees who were designing more than \$1,000,000 worth of construction each week. This was the Kahn firm as it stood when called upon by Ford to design the branch assembly plant in Richmond, California.⁵²

With the onset of the Great Depression, sales of automobiles dropped, and auto companies and other industrial firms curtailed their plans for expansion of the plant and capacity. Correspondingly, Kahn's roster of domestic commissions languished, and his firm would have suffered were it not for a new venture he began in 1929. The Soviet Union, through its international commerce arm the Amtorg Trading Corporation, commissioned him to design a giant tractor factory at Chelyabinsk. Kahn was initially reluctant because the United States had still not recognized the Soviet government, many of Kahn's American clients were strongly anti-communist, and the Nazis and anti-Semites in the U.S. often accused Jews of being communist sympathizers, a label that thereby might affix to him. He concluded, however, that the Russian people had long suffered under the czars and were as entitled to benefits deriving from good factory design as anyone. He could contribute in that regard. During the next three years, Kahn

⁵⁰ Hildebrand, *Designing for Industry*, 72-123; Bucci, *Albert Kahn*, 48-57.

⁵¹ Editors Note: According to Leland Roth, *A Concise History of American Architecture* (Boulder, CO: Westview Press, 1980), 252-253, Kahn was a "dedicated advocate" of "traditional" university and public buildings. Interestingly enough, Kahn wanted to be remembered for the William L. Clements Library rather than his factory designs. His attitude reflects conceptions of architecture in the early twentieth century. Public buildings tended to exhibit characteristics of what were considered "traditional styles" of architecture, while commercial and industrial buildings could be more modern and innovative in form. Kahn's work could be interpreted as showing this dichotomy.

⁵² Hildebrand, *Designing for Industry*, 100, 124-126, 133-149; Bucci, *Albert Kahn*, 62-64.

and his firm designed several other huge industrial plants inside the Soviet Union, at least one of which was in conjunction with the Ford Motor Company, which was also in a contractual relationship with Amtorg. Ford agreed to supply the Soviets with plans, specifications, management systems, and technical assistance for the construction at Niznij Novgorod of an automotive plant based on the River Rouge model, and Kahn designed the complex. Kahn and his staff not only designed industrial buildings for the Soviets, but also they established a branch office in Moscow to help train Russian architects and engineers in the principles of factory design on the Ford/Kahn model. Not surprisingly, Kahn did have to defend himself against accusations in the U.S. that he was supporting the communists, accusations which subsided after his contract with the Soviets ended in 1932.⁵³

As the need for new construction re-emerged in the mid-1930s, Kahn again began to secure domestic industrial projects, including the Lady Esther cosmetics factory in Illinois, giant new plants for Chevrolet, Chrysler, Dodge, and DeSoto in Michigan, and several more airplane factories for such clients as United Aircraft Corporation and Glenn L. Martin again. With war on the horizon in the late 1930s and with Congress and the U.S. military taking steps to mobilize American industry for the production of aircraft, Kahn secured more airplane factory commissions in the early 1940s, including Wright Aeronautical Corporation in Ohio, Consolidated Aircraft Corporation in New Orleans, Curtiss Wright Corporation in Kentucky and New York, and Ford's Willow Run plant in Michigan. Kahn also designed the giant Chrysler Tank Arsenal in Detroit and a torpedo plant for the Navy and American Can Company. Albert Kahn died in 1945 after becoming the most prolific and influential architect of industrial structures in the first half of the twentieth century. His firm, Albert Kahn Associated, Inc., exists to this day.⁵⁴

C. The Building, Then and Now

The Ford Motor Company assembly plant at Richmond is 1,050' long from north to south and 320' wide from east to west. The main body of the building is 950' x 320', and there is a craneway, 100' wide, that extends along the south end, giving the building its total length of 1,050'. The craneway is built over the water and actually extends an additional 80' to the east as well, so that the south end of the building measures 400'. A boiler room (80' x 55') is located at the inside corner of the "L" formed by the main body of the building and the craneway. There is a dock structure 40' wide running along the entire south end the building (the craneway), and the dock is also built over water. These are the original dimensions of the building.⁵⁵

⁵³ Hildebrand, *Designing for Industry*, 128-130; Bucci, *Albert Kahn*, 88-94.

⁵⁴ Hildebrand, *Designing for Industry*, 166, 180, 197-205; Bucci, *Albert Kahn*, 77-87, 101-114. For a recent assessment of Kahn's place in the history of modernism and American architecture, see Brian Carter, ed., *Albert Kahn: Inspiration for the Modern* (Ann Arbor: University of Michigan Museum of Art, 2001). For an excellent collection of photos of Kahn's buildings, see W. Hawkins Ferry, *The Legacy of Albert Kahn* (Detroit: Wayne State University Press, 1987). The book features a concluding essay by Walter B. Sanders, "Albert Kahn Associates, 1942-1970," that reviews major projects by the Kahn firm after his death.

⁵⁵ Albert Kahn, Inc., Architects, Assembly Building of Ford Motor Company, Richmond, California, Job No. 1562, "Plot Plan," Sheet 1, dated 22 May 1930.

The building has a slab-on-grade, a steel frame with the columns sitting on spot footings atop pilings, and curtain walls of brick, industrial garage doors, and industrial window sash. The west half of the main body of the building is two stories, and the east half is one story. Sawtooth roof trusses create skylights over the second floor of the west half and the first floor of the east half. The craneway is two stories throughout. Most of the interior of the building is open factory space, but the northwest corner of the building has partitions that divide areas into showroom and office spaces. There is a free-standing oil house just northeast of the boiler room.⁵⁶

Historically, two sets of railroad spurs served the plant, both entering the Ford property at the northeast corner. One set of two spurs curved toward the plant and approached the northeast corner of the building from the north. One spur actually entered the building at that corner at a grade several feet below the first floor, and the other spur ran along the outside of the east side. Both of these spurs extended the full length of the main body of the building. Although there is evidence of the interior set of tracks, most of the area along that spur has been filled and the floor there is now at the level of the first floor. The other set of spurs ran along the east side of the property and curved toward the southeast corner of the plant, approaching it from the east. One spur entered and extended the length of the crane way, and two others ran the length of the dock. Another pair of spurs in this set ran along the north side of the oil house.⁵⁷

The general flow of materials to and through the plant was as follows. Ford delivered auto parts to the craneway of the Richmond plant either by ship or by rail. A conveyor, located at the center of the south end of the second floor, transported unpainted body parts from the craneway through a slot in the concrete floor to the second floor for storage, painting, and partial assembly.⁵⁸ Conveyors, probably added later in the 1930s, delivered other body parts, like roof panels of car bodies, from the delivery dock along the east side of the plant to the second floor.⁵⁹

⁵⁶ Albert Kahn, Inc., Architects, Assembly Building of Ford Motor Company, Richmond, California, Job No. 1562, "Sections and Details," Sheet 6, dated 22 May 1930.

⁵⁷ Albert Kahn, Inc., Architects, Assembly Building of Ford Motor Company, Richmond, California, Job No. 1562, "Plot Plan," Sheet 1, and "First Floor Plan," Sheet 3, both dated 22 May 1930.

⁵⁸ The earliest known drawing of the layout of equipment on the second floor of the Richmond plant is "Assembly Building - Richmond - Second Floor Layout," drawing dated 1 May 1939 and included in M. Wiesmyer, "Branch Operations - Richmond." Although, there may have been some modifications to the layout, so that the configuration in 1939 was different from 1931 when Ford was still producing the Model A, the general scheme and location of equipment as described here matches the evidence in photographs produced in 1931 at the Richmond plant. The photos show the assembly equipment being installed in the plant, construction of which had just been completed. See, for example, photo no. 2011 (folder 1) dated 23 May 1931 and showing the first coat of plaster complete on the body prime ovens, located along the west side of the second floor; photo no. 2026 (folder 2) dated 14 June 1931 and showing the trim and finish trim conveyors with Cooper-Hewitts (task-lighting fixtures) installed down the center of the second floor; photo no. 2050 (folder 4) dated 25 July 1931 and showing the body stock conveyor from the southeast corner of the second floor; photo no. 2052 (folder 4) dated 25 July 1931 and showing the closed body construction conveyor from the south end of the second floor; all photos HFM Acc. No. 696, box 8.

⁵⁹ Photo without number (folder 8) dated June 1937 and showing conveyor for delivering body stock from unloading dock to second floor; photo without number (folder 8) dated July 1937 and showing conveyor delivering body stock from unloading dock to second floor; photo without number (folder 8) dated 1937 and showing conveyor delivering body roof panels to roof panel storage at south end of second floor; all photos HFM Acc. No. 696, box 8. The opening in the east wall for this conveyor appears in the 1939 drawing for the second-floor layout, but it does not appear on the original Kahn drawings. It is therefore likely this conveyor was added sometime in the 1930s after Ford ceased producing the Model A.

An incline conveyor delivered partially assembled bodies to the central area of the first floor for further treatment before delivery to the final assembly line.⁶⁰ Materials for assembly of seat cushions and service stock parts were also delivered to the second floor, either by means of the conveyors or by two freight elevators, one located at the southeast corner of the second floor and one located along the east wall of the second floor near the north end. Both elevator shafts are still in place. Service stock storage was located at the northeast corner of the second floor. The seat cushion assembly area was located just south of the second-floor offices and the service stock storage area.⁶¹

The final assembly line was located along the west wall of the first floor, with vehicles in the process of assembly moving from south to north.⁶² Tributary sub-assembly lines moved from east to west toward the final assembly line. The frame conveyor was located at the south end of the first floor, moving from east to west and with the steering gear assemblies being installed just before the frames were placed on the final assembly conveyor. Conveyors for axle assemblies led from north to south toward the frame conveyor.⁶³ The motor line was just north of the frame conveyor, again moving from east to west, where completed motors could be installed on frames as they moved north along the final assembly line. North of the mounting line was an area for tire storage (east), a wheel oven for baking freshly painted wheels (west), a mounting line, along which tires were mounted on wheels before the wheels were conveyed to the final assembly line to be mounted on the chassis as they moved north, and radiator storage racks.⁶⁴ The next area to the north was quite large, featuring ovens and lines along which such items as fenders, hoods, and trim were treated before being assembled as bodies and then conveyed to the chassis

⁶⁰ Photo no. 2039 (folder 3) dated 28 June 1931 and showing construction of the incline conveyor for bringing bodies from the second floor to the first; photo no. 2040 (folder 3) dated 12 July 1931 and showing incline conveyor from first floor to balcony; photo no. 2057 (folder 4) dated 25 July 1931 and showing table for loading bodies onto incline conveyor; all photos HFM Acc. No. 696, box 8.

⁶¹ Photo no. 2055 (folder 4) dated 25 July 1931 and showing the cushion assembly area at the north end of the second floor, HFM Acc. No. 696, box 8.

⁶² The earliest known drawing of the layout of equipment on the first floor of the Richmond plant is "Assembly Building - Richmond - First Floor Layout," drawing dated 1 May 1939 and included in M. Wiesmyer, "Branch Operations - Richmond." As with the second floor, there is a nice match between this 1939 drawing and the 1931 photos of assembly equipment as it was being installed at the Richmond plant. See, for example, photo no. 2013 (folder 1) dated 29 May 1931 and showing the escalator and the final assembly line under construction; photo no. 2041 (folder 3) dated 12 July 1931 and showing the escalator and final assembly line; photo no. 2068 (folder 5) dated 25 July 1931 and showing the south end of the chassis assembly line; all photos HFM Acc. No. 696, box 8.

⁶³ Photo no. 2030 (folder 2), no date, showing axle conveyors and Model A and Model AA frame conveyors, HFM Acc. No. 696, box 8.

⁶⁴ Photo no. 2045 (folder 3) dated 12 July 1931 and showing wheel delivery conveyor; photo without number (folder 8) dated June 1937 and showing conveyor, adjacent to tire storage, for delivering body stock from unloading dock to second floor; photo without number (folder 8) dated July 1937 and showing conveyor, adjacent to tire storage and wheel storage, for delivering body panels from unloading dock to second floor; all photos HFM Acc. No. 696, box 8.

assembly line.⁶⁵ Body hoists along the final assembly line hoisted completed bodies down upon the completed chassis as they moved north along final assembly.⁶⁶ Completed cars and trucks rolled off the north end of assembly line, located about 300' south of the northwest corner of the building.⁶⁷

There were several openings in the east wall of the second floor through which conveyors delivered body parts to the second floor and carried assembled bodies and delivered them to subsequent conveyors for body assembly on the first floor. The original drawings for the building show only two openings for conveyors to the second floor: the one through the floor at the south end of the building, mentioned in a previous paragraph, and one midway along the east wall of the second floor. This is undoubtedly the opening at the head end of the incline conveyor shown in photo no. 2057.⁶⁸ There are at least two other openings through the east wall that match the appearance of that in the 1937 photo of the conveyor delivering roof panels to the roof panel storage area (the corners of the openings are cropped).⁶⁹ The current developer of the Richmond plant is changing the spacial relationship between the second floor and the first by cutting a polygonal opening in the east wall at each first-floor skylight bay. The shape of these openings parallels the slope of the north-facing skylight windows, but it does not stem from the shapes of the openings for the conveyors that were part of the production process.

Although most of the interior of the Richmond plant is open space, there are several enclosed, partitioned areas. General offices for the plant were located on the second floor at the northwest corner. They included individual offices for managers, small meeting rooms, a cashier's office, and rest rooms. These offices are the only rooms finished in wood. With small exceptions, the configuration of the offices is that shown on the Kahn drawings of the plant. There are four sets of coat rooms and toilet rooms for production workers located along the east wall of the second floor. These sets of rooms are located in enclosed mezzanines that are two

⁶⁵ Photo no. 2002 (folder 1) dated 15 May 1931 and showing the unloading end of the enamel oven under construction; photo no. 2005 (folder 1) dated 15 May 1931 and showing the loading end of the enamel ovens under construction; photo no. 2019 (folder 2) dated 8 June 1931 and showing the south end of an enamel oven and the ventilation system for the commercial body spray booth; photo no. 2022 (folder 2) dated 8 June 1931 and showing the south end of the assembly line and the overhead supporting steel for bicycle tools; photo no. 2049 (folder 4) dated 25 July 1931 and showing the sand line and solvent booth; photo no. 2058 (folder 4) dated 25 July 1931 and showing the unloading end of the enamel oven; photo no. 2061 (folder 4) dated 25 July 1931 and showing fender conveyor and the washing machine and burn-off oven; photo no. 2062 (folder 4) dated 25 July 1931 and showing hood and enamel storage area and delivery conveyors adjacent to north end of final assembly line; all photos HFM Acc. No. 696, box 8.

⁶⁶ Photo no. 2065 (folder 5) dated 25 July 1931 and showing commercial body conveyors and hoists; photo no. 3018 (folder 7) dated June 1937 and showing the final assembly line near the north end; all photos HFM Acc. No. 696, box 8.

⁶⁷ Photo no. 2062 (folder 4) dated 25 July 1931 and showing hood and enamel storage area and deliver conveyors adjacent to north end of final assembly line; photo without number (folder 7) dated ca. 1933 and showing a truck moving along the escalator at the north end of the final assembly line; all photos HFM Acc. No. 696, box 8.

⁶⁸ Photo no. 2057 (folder 4) dated 25 July 1931 and showing table for loading bodies onto incline conveyor, HFM Acc. No. 696, box 8.

⁶⁹ Photo without number (folder 8) dated 1937 and showing conveyor delivering body roof panels to roof panel storage at south end of second floor, HFM Acc. No. 696, box 8.

steps down from the second floor and extend into the sawtooth roof skylights over the east side of the first floor. A pair of staircases, each with midway landings, one stair on the north and one on the south, descended from each coat room/toilet mezzanine. These stairs have been altered over the years by completely removing one of the pair in some cases and also by altering the direction of the stairs extending from the landings to the first floor, undoubtedly to accommodate alterations to the assembly equipment on the first floor. Production workers used to enter the plant near the northeast corner, just west of the railroad spur. The employee entry area has been altered over the years. Just west of the employee entrance, however, is a set of rooms that appears to be configured much as they were in 1931. They include a factory service office, a first aid room, operating room, rest rooms, and a dressing room. The showroom area on the first floor beneath the general offices has been changed considerably since the plant was used to assemble autos. The main feature that is partially intact is the formal plant entrance and the relatively grand stairway to the second-floor offices.⁷⁰

The exterior of the plant has sustained little change over the years. The brick and glass exterior is industrial in character throughout, with its limited and modest ornamentation at the corners of the building, in the minimal application of dentils along the roof-line, and in the gable ends of the craneway. The exception to the industrial character is at the northwest corner, where the showrooms (first floor) and general offices (second floor) were located. The fact that these spaces were more open to the public (at least the public who had business at the plant) is reflected in the window configuration and the roof. Whereas windows throughout the factory are industrial sash, the windows at the northwest corner are double-hung with transoms, presenting a more commercial appearance. A truncated hipped roof of glazed clay tile projects above the offices, delineating the non-industrial area of the building by again presenting a more commercial appearance, and the dentils in the cornice beneath the eaves of the tile roof are somewhat more elaborate than the dentils elsewhere. Except for modifications to some of the doors, the exterior is largely intact.⁷¹

D. Operation during the 1930s

Ford's three new assembly plants on the Pacific Coast opened in the early 1930s. The Long Beach plant was the first to open in 1930. The Richmond plant opened on August 1, 1931, and the Seattle plant commenced operations in early 1932. Because of the onset of the Great Depression, demand for autos was down, and the Richmond plant employed only 1,000 at the outset. Despite the Depression, Ford maintained its record of expansion around the world. The year 1931 saw the opening of four other assembly plants in addition to the one at Richmond. Plants went into service at Buffalo, New York; Cologne, Germany; and Madras, India, and the new facility at Dagenham, near London, England, became the second-largest automobile manufacturing plant in the world after Ford's River Rouge plant. At about the time the Richmond plant began operating, Ford also inaugurated the manufacture of body parts and pressed sheet steel parts at its Long Beach Plant. The new department at Long Beach supplied hoods, fenders, and other body parts to the Ford assembly plants at Long Beach, Richmond,

⁷⁰ Albert Kahn, Inc., Architects, Assembly Building of Ford Motor Company, Richmond, California, Job No. 1562, "First Floor Plan," Sheet 2, and "Second Floor & Roof Plans," Sheet 4, both dated 22 May 1930.

⁷¹ Albert Kahn, Inc., Architects, Assembly Building of Ford Motor Company, Richmond, California, Job No. 1562, "Elevations," Sheet 5, dated 22 May 1930.

Portland, and Seattle.⁷²

Getting the Richmond plant ready to operate entailed completing the building and installing the assembly-line and ancillary equipment necessary for the assembly of parts made elsewhere into finished autos. Ford moved very little of that equipment from the San Francisco plant. By mid-July, equipment was installed and the plant, under the management of Charles A. Bulwinkel, began assembling Model A and Model AA cars.⁷³

The Richmond plant was originally organized into several departments, including the Sales Department, Accounting Department, Production Department, Inspection Department, Stock Department, and Receiving Department, each of which was headed by a superintendent. The Production Department was sub-divided into several of its own departments, each headed by a foreman. Those departments were the assembly line, body production, body trim, body paint, enameling, and the stock department. Shift foremen supervised the workers and reported to their respective department foremen.⁷⁴

The Ford Motor Company and local organizations sponsored a variety of events to celebrate the Richmond plant's opening on August 1st. The night before, the Richmond Chamber of Commerce held a banquet featuring a speech by California's governor. The day of the opening, caravans of Ford cars carrying dealers and enthusiasts said to represent more than 250 cities in northern and central California converged on Richmond. The Ford Motor Company hosted a luncheon for about 1,000 of California's business people and then dedicated the plant with speeches, after which the first automobile rolled off the assembly line. Following the official ceremony, the company opened the plant to visitors, giving tours throughout the day to about 20,000 people. The operating plant remained open to tours for a week, and as many as 100,000 people observed the assembly line in operation during the festivities.⁷⁵

The Ford Motor Company's first ship to deliver parts to Richmond, under the command of Capt. O.L. St. Marie, arrived later in August carrying engines, axles, and frames. It had already stopped at the Long Beach plant. After Richmond, it was bound for the Ford plant at Portland before returning to the Atlantic Coast. The parts had not traveled all the way to Richmond by water; however, Ford had sent them by rail to Chester, Pennsylvania, where they were loaded on the ship.⁷⁶

⁷² "Ford Is Completing Third Coast Plant," *Automobile Topics* 103 (8 August 1931): 12; "Making Pressed Steel Parts at Long Beach," *Ford News* 11 (September 1931): 4; "1931: a Year of Progress in the Ford World," *Ford News* 12 (January 1932): 10.

⁷³ "Plant Questionnaire" dated 10 February 1932, in chapter on Richmond in M. Wiesmyer, "Branch Operations," unpublished preliminary report dated 26 April 1956, HFM Acc. No. 106; "History of Richmond Branch," unpublished report dated 18 March 1941, HFM Acc. No. 429, box 2, Richmond, CA, folder, "The Reminiscences of Mr. Clarence Bulwinkel," 27.

⁷⁴ "The Reminiscences of Mr. Clarence Bulwinkel," 28.

⁷⁵ "New Plant Opens on San Francisco Bay," *Ford News* 11 (September 1931): 4; "The Reminiscences of Mr. Clarence Bulwinkel," 27-28.

⁷⁶ "Ford Boat Delivers Parts," *Automobile Topics* 103 (29 August 1931): 224.

The Richmond Branch supplied autos to Ford dealerships in its territory, which included Hawaii. Depending on demand in other regions and the output of the assembly plants serving those regions, the Richmond Branch also supplied cars to the Seattle, Portland, Salt Lake City, and Long Beach territories.⁷⁷ The Richmond plant also housed a Stock Department, which stored a stock of Ford parts to supply dealerships throughout the Pacific Coast region.⁷⁸

The Richmond and other Pacific Coast plants had opened during an inauspicious time, though, because of the lagging demand for autos. Several Ford assembly plants around the country closed temporarily at the end of 1931 and did not open again until late in the spring of 1932. Ford's problems were compounded by stiff competition from Chevrolet and the newcomer in the economy-car market, Plymouth. After a peak in car sales in 1929, when the economy was still robust, the market slumped through the early 1930s. The three economy makes--Ford, Chevrolet, and Plymouth--sold a combined 2,174,000 autos in 1929, with Ford accounting for more than 60 percent of those sales. Even though the three automakers' combined sales slumped to 1,737,000 in 1930, Ford retained its 60 percent share. In 1931 and 1932, even as overall sales continue to decline each year, Ford's share of that total fell to 44 percent and 35 percent respectively. In 1932, Ford sold only 258,000 autos. During those years, Chevrolet's sales declined, but not as precipitously as Ford's, and Plymouth's sales actually grew. One reason for the slip in Ford sales was the difficulty the company had in changing the Rouge plant over to the V-8 engine.⁷⁹

The Ford Motor Company introduced its new V-8 engine to great fanfare in 1932. Conscious of the pioneering role the Model T had played twenty-five years earlier, *Ford News* claimed that its V-8 was pioneering into the next stage of the automobile age:

The Model T blazed the way for the motor industry. It was almost entirely utilitarian in character. It pioneered in an era when the public was not conscious of its need for motor cars. The V-8 pioneers in an era when that conscious need is universal.

Personal transportation should never be a luxury. It and the latest of its refinements are the rightful heritage of every man, woman, and child in America. Modern civilization has given it to them. This heritage is the wholly reasonable and logical outgrowth of higher standards of living.⁸⁰

The change was very disruptive to Ford sales, however. Just as the switch from the Model T to the Model A disrupted production schedules, leading to a sharp drop in sales in 1927, the switch to the V-8 led to cuts in 1932 Ford sales to a number less than half of 1931 sales. Conversion to

⁷⁷ "History of Richmond Branch," unpublished report dated 18 March 1941, HFM Acc. No. 429, box 2, Richmond, CA, folder.

⁷⁸ "History of Richmond Branch," unpublished report dated 18 March 1941, HFM Acc. No. 429, box 2, Richmond, CA, folder.

⁷⁹ "Ford Branch Assembly Is Getting Under Way," *Automobile Topics* 106 (21 May 1932): 139; "Ford Branch Production Continues to Increase," *Automobile Topics* 106 (4 June 1932): 236; "Mr. Ford Doesn't Care," *Fortune* 8 (December 1933): 66.

⁸⁰ "A New Car: The Ford V-8," *Ford News* 12 (April 1932): 3.

the V-8 was delayed because of mechanical problems with the new engine block that Ford engineers discovered at the River Rouge plant.⁸¹

The Ford Motor Company began manufacturing Mercuries at the Richmond plant in 1938. The Richmond Branch supplied Mercuries to all the Ford territories on the Pacific Coast and to the Hawaiian Islands.⁸²

The Ford Motor Company assembled its ceremonial twenty-seven-millionth car at the Richmond Branch on 15 February 1939. It was the first time the company had designated one of its assembly plants outside of Detroit or Dearborn for the honor of producing a "millionth" Ford.⁸³

Throughout the 1930s and into the 1940s, the Richmond Branch remained fully integrated into the Ford Motor Company's continent-wide and world-wide system of production. Thus, managers of the Richmond Branch had to obtain authority from Dearborn to conduct extraordinary activities, whether large or small. A relatively large project for which Richmond sought approval in the summer of 1940 concerned repairs to the rock rip-rap along the water's edge of the Ford property, necessitated by recent storm damage. Manager W.A. Abbott sent photographs of the damage to the Branch Operations Superintendent's Office in Dearborn, described the remedy he proposed, and asked for comments on his proposal and for the authority to solicit bids from contractors to make the specified repairs. Dearborn authorized the repairs and instructed Abbott in the specifications he should issue to bidders. Upon receipt of bids, Abbott forwarded them to Dearborn, along with his recommendation of which contractor's bid to select. Dearborn approved the recommendation, pending the contractor's certification that it was properly insured against liability and workers compensation.⁸⁴

Likewise, Abbott needed Dearborn's approval for something as significant as raising employees' pay. In 1940, for example, Abbott wanted raise the pay for several salaried superintendents, foremen, and clerks. Some of the individuals had recently been transferred to new, more responsible positions, but they had not yet received raises commensurate with their new posts. Others had taken on challenging new tasks in their existing positions, and Abbott wanted to give them raises to reward the quality of work they were doing. Abbott did not, however, have the authority to grant raises without approval from Dearborn, so he wrote to the

⁸¹ "Mr. Ford Doesn't Care," *Fortune* 8 (December 1933): 66-67; "The Reminiscences of Mr. Clarence Bulwinkel," 28-29.

⁸² "History of Richmond Branch," unpublished report dated 18 March 1941, HFM Acc. No. 429, box 2, Richmond, CA, folder.

⁸³ "27-Millionth Ford Made At Richmond," 15 February 1939 newspaper clipping in HFM Acc. No. 99, Richmond, CA, Branch Clippings folder; "History of Richmond Branch," unpublished report dated 18 March 1941, HFM Acc. No. 429, box 2, Richmond, CA, folder.

⁸⁴ W.A. Abbott to Superintendent's Office, Dearborn, undated memorandum; Abbott to Power & Construction, Dearborn, memoranda dated 21 June & 11 July 1940; H.B. Hanson to Abbott, telegram dated 2 July 1940; all in HFM Acc. No. 371, box 16, folder 1.

Payroll Office there explaining his reasons for wanting to issue the raises.⁸⁵

Ford's central Branch Operations Office in Dearborn also maintained control of seemingly more minor matters. Thus, when Branch Operations decided to make a system-wide change, each branch, including Richmond, was expected to implement it unless some local condition suggested an exception be made, in which case the local branch needed to request such an exception. Letters from the 1940s in the Records of the Ford Motor Company at the Henry Ford Museum indicate the extent to which Dearborn supervised small details at the branch operations. For example, the Dearborn Superintendent's Office sent a letter to all branch plants in 1940 describing the kinds of oxygen tanks and breathing apparatus they were expected to have in their first aid departments. The plant physician at the Richmond plant, however, recommended against the purchase, because the City of Richmond had such emergency equipment available within five minutes of a call. Richmond branch superintendent W.A. Abbott therefore requested that Richmond be exempted from the required purchase, stating that he would buy the equipment, though, if the Dearborn office required it nevertheless. In another instance, Richmond's general foreman Charles Johnson wished to remove a spray booth and oven that was intended for use on small parts. His crews had begun painting in small booths in other departments, so he wished to remove the booth and oven in question to make space available for other purposes, but he needed to seek authority from Dearborn to do so.⁸⁶ This experience of working as a component in a much larger system perhaps helped prepare Ford's Richmond managers for their participation in the World War II production.

E. Production for the Civilian Market in the Early 1940s

Henry Ford had an extensive empire of auto plants throughout Europe at the end of the 1930s. Dearborn managed all of them through Dagenham, England, except the plants in Germany and France, which were autonomous from Dagenham but still managed by Dearborn. While Adolf Hitler and the Nazis were appalling much of the world with their treatment of Jews and imposing military escalation, Henry Ford showed little concern. In 1938, Ford was even willing to become the first American to receive an award, the Grand Cross of the Supreme Order of the German Eagle, from Hitler's government.⁸⁷ Ford also tried to remain neutral in Asia, even as Japan invaded and occupied countries like China and Korea. The company produced and shipped several thousand military trucks to Japan from the Richmond dock in 1937.⁸⁸ Although Ford wanted to remain neutral as hostilities loomed, nationalistic forces soon wrested control of

⁸⁵ Abbott to Payroll Office, Dearborn, memorandum dated 14 June 1940, HFM Acc. No. 371, box 16, folder 1.

⁸⁶ Charles Johnson to Superintendent's Office, Dearborn, memorandum dated 11 July 1940, and W.A. Abbott to Medical Department, Dearborn, memorandum dated 22 July 1940, both in HFM Acc. No. 371, box 16, folder 1.

⁸⁷ *Labor Herald* (11 August 1938): 3. A headline, "Fordism Is Fascism...This Proves It!", appears over a photograph of Ford, on his 75th birthday, receiving the award from Karl Kapp, German consul in Cleveland.

⁸⁸ "Hitler Decorated Ford: His Workers Apply for Relief," *Labor Herald* (11 August 1938): 1. The article is primarily about how production at Ford plants was so low that Ford workers had to apply for relief much of the year, but the article also points out that Ford produced military trucks the previous year for Japan in its invasion of China. The author has not verified this production for the Japanese military in Ford sources. That Ford's Richmond plant produced trucks for the Japanese government is corroborated, however, in "Parley Ends Ford Strike," *Richmond Independent* (24 April 1937): 3.

Ford production in Germany away from Dearborn and placed it in support of the building Nazi war machine. As the Nazis swept through most of western Europe, Ford plants in Hungary, France, Denmark, and the Netherlands also came under German control. Until the attack on Pearl Harbor and formal declarations of war in December 1941 made Germany and Japan enemies of the United States, Ford managers in Dearborn maintained limited communications with the German managers and even continued shipping some auto parts to Ford plants in occupied countries. Meanwhile, Ford's plant at Dagenham turned its production to the defense of England.⁸⁹

In 1940, while Europe and Asia had gone to war and the United States still struggled with economic depression, the Richmond Branch produced about 100 cars each day. As in previous years, the plant turned out many but not all of the models Ford offered. As mentioned earlier, Richmond was now a Mercury assembly plant, so five models of Mercuries including sedans, coupes, and convertibles comprised about one-quarter of Richmond's output. About half of the Mercuries Richmond produced were Town Sedans. All the Mercuries had 95-hp engines. Richmond produced Fords in seven body types, including sedans, coupes, convertibles, and station wagons. Most were equipped with 85-hp engines, but some had either 60-hp or 95-hp engines. The plant produced no trucks during the first seven months of the year. Then in August, while much of the plant was converting for production of the new 1941 model cars, Richmond produced 200 light trucks of the 1941 model, including pick-ups, panel delivery trucks, and commercial cab-over-engine truck chassis that others bought to finish as dump-trucks and delivery trucks. About half of the trucks had 85-hp engines and the rest had 95-hp engines. In September, the plant turned out 1,130 light trucks as well as nearly 800 1941-model cars. Even with the possibility of war looming for the U.S. and with Ford and other automakers beginning to increase military production, Ford's 1941 models featured a variety of changes. Wheelbases and overall lengths were longer, the cars were wider, and the greater size led to changes in exterior and interior styling. With more of the nation's workers returning to work because of huge increases in production of military ordnance, sales of Ford's 1941 models were among the best ever.⁹⁰

When Ford rolled out its new 1942 models, however, a different set of parameters shaped the design. The federal government had started to divert certain strategic metals to the production of military weapons, ammunition, and equipment, leaving less for the automobile industry. Ford responded by nearly eliminating the use of aluminum in its 1942 cars and trucks and reducing dramatically the amounts of nickel, magnesium, and tungsten. This led to visual changes, like the elimination of nickel and chrome finishes on wheel rings, headlights, hood ornaments, and other decorative features, as well as to heavier cars. Those changes in design became moot in January 1942, however, when Donald Nelson and the War Production Board issued a decree that after the end of the month no materials would be authorized for use in

⁸⁹ Nevins and Hill, *Ford: Decline & Rebirth*, 273-281.

⁹⁰ Monthly Report of Total Assemblies, Form 6116, Richmond Branch, for the months January through September 1940, HFM Acc. No. 468, box 9; "It's a Big, New Car: 1941 Ford," *Ford News* 20 (October 1940): 219-227; "Progress in the Ford World," *Ford News* 22 (January 1942): 24.

manufacturing new passenger cars and trucks for civilian use.⁹¹

America's auto industry was one of the nation's largest, so with the termination of civilian car production the industry could turn its entire attention and energy to the production of ordnance for the military. The converted auto industry therefore achieved a remarkable record during the years 1942-1945. Of the United States' total output for the military during the war, American auto makers produced more than 20 percent, including more than 50 percent of the aircraft engines, 33 percent of the machine guns, 80 percent of the tanks and tank parts, 50 percent of the diesel engines, and 100 percent of the trucks. The U.S. built more B-24 bombers during the war than any other airplane, and the auto industry built most of those B-24s.⁹² The next chapter describes the role of Ford's Richmond assembly plant in helping to accomplish that tremendous output.

CHAPTER FOUR: WORLD WAR II

As Nazi Germany launched its heaviest air raid yet against London late in 1940, President Franklin D. Roosevelt addressed the nation on December 29th with his "Arsenal of Democracy" fireside chat. He presented his argument to the American people that, as a matter of national defense, the United States must rise to Britain's aid by manufacturing and delivering the munitions and supplies Britain needed to defend itself against Hitler's aggression. Most of Europe had already fallen to the Germans, Germany and Italy were conquering much of Africa, and Japan was conquering parts of Asia. If the U.S. did not help stem the tide of that aggression, the Axis powers would not only control several continents but the high seas as well, putting the Axis in position to launch an attack on the U.S. and the western hemisphere. In January 1941, Roosevelt would ask Congress for authority to lend or lease munitions and supplies to Great Britain and other allies, and soon Congress authorized a formal Lend-Lease Program that helped to sustain the militaries of England, the Soviet Union, and China in the face of onslaughts mounted by German and Japanese forces. Thus began, after a slow start in the late 1930s, the rapid mobilization of America's industrial might. When the U.S. entered the war in December 1941, the expansion of the United States' capacity to produce munitions was therefore already well underway. According to historian Kent Roberts Greenfield, this use of America's industrial might was the cornerstone of Roosevelt's grand strategy to win the war through material superiority and thereby with the minimum loss of Americans' lives.⁹³ Historian Alan Gropman says that Roosevelt's grand strategy is what won the war:

It's an old story, but bears repeating. The United States used a logistic strategy (as opposed to Hitler's *Blitzkrieg* strategy) to build armaments in depth

⁹¹ "Savings in Defense Metals," *Ford News* 21 (October 1941): 259, 270; "Mercury 8 for 1942," *Ford News* 21 (October 1941): 260-261; "The Beautiful New Ford for 1942," *Ford News* 21 (October 1941): 262-263; "1942 Ford Trucks," *Ford News* 21 (October 1941): 266-267; "Progress in the Ford World," *Ford News* 22 (January 1942): 25; Nevins and Hill, *Ford: Decline and Rebirth*, 198-199.

⁹² Donald Nelson, *Arsenal of Democracy: the Story of American War Production* (New York: Harcourt, Brace and Company, 1946), 212-224.

⁹³ Doris Kearns Goodwin, *No Ordinary Time: Franklin & Eleanor Roosevelt: The Home Front in World War II* (New York: Simon & Schuster, 1994), 194-195; Alan Gropman, "Introduction," in *The Big L: American Logistics in World War II*, ed. Alan Gropman (Washington, DC: National Defense University Press, 1997), xv-xviii; Kent Roberts Greenfield, *American Strategy in World War II: A Reconsideration* (Malabar, FL: Robert E. Krieger, 1982), 74, cited in Gropman, "Introduction," xvi.

rather than in width. Hitler, who expected to win his wars quickly, did not invest in infrastructure--that is, he did not use his raw materials to build new munitions factories; he used materials to build new munitions. When he discovered that the war was to be a long one, he had to begin building factories after the United States had completed its factory construction. Germany mobilized more men for its army than did the United States (with a much smaller population), spent a greater part of its gross national product on the war than the United States, and had a higher percentage of its women producing in industry than the United States, but it did not produce sufficient armaments and was drowned in a sea of allied munitions.⁹⁴

Ford's Richmond assembly plant was part of the gigantic American system of industrial production that helped to drown Hitler and the Axis powers in a sea of munitions. This chapter describes the activities that took place at the Richmond plant in support of the United States' war effort. The Richmond plant operated during the war under a contract the Ford Motor Company had with the U.S. Army's Ordnance Department to assemble jeeps and to process tanks for shipment overseas. Called the Richmond Tank Depot during the war, the Ford Motor Company still owned and operated the plant, but an Army officer in Ordnance Department officially commanded it.

To help understand the activities at the Richmond Tank Depot during the war, this chapter also provides some historical context for several features of the environment within which the Richmond plant operated. First, there was the overall set of programs the Roosevelt Administration put in place to try to insure that the nation's industrial infrastructure could meet the challenge of war without running short of raw materials, without exploiting workers, without profiteering by individuals or corporations who might try to take advantage of the wartime market, and without wreaking havoc on the economy through dramatic price increases. Then there was the specific set of programs that the Ordnance Department put in place to procure the necessary weapons, ammunition, vehicles, and other supplies needed by the U.S. Army's fighting forces and by America's allies. There was also mobilization of the Ford Motor Company generally to participate in the nation's war production effort. Finally, this chapter provides some historical background on the development of the jeep, the one kind of vehicle that was actually assembled at the Richmond plant. These bits of historical context are interwoven with descriptions of what actually took place at Richmond.

Another theme that is important to consider while examining the history of the Richmond plant is the growth of large-scale technological systems in the United States. Such systems came into public consciousness during the post-World War II period with the advent of America's Atlas and Polaris missile programs, the celebrated effort by the National Aeronautics and Space Administration (NASA) to put a man on the moon, the emergence of think-tanks like RAND that contracted to perform complex systems analyses, the use of computers in support of those projects and programs, and the widespread efforts by businesses and all levels of government to apply the systems approach to solve social problems.⁹⁵ Since that time, several historians have

⁹⁴ Gropman, "Introduction," xviii.

⁹⁵ On the application of the systems approach (systems engineering, systems management, systems analysis, etc.) to military and aerospace projects, see Thomas P. Hughes, *Rescuing Prometheus* (New York: Pantheon, 1998); Agatha C. Hughes and Thomas P. Hughes, eds., *Systems, Experts, and Computers: The Systems Approach in*

explored the history of the development of systematic approaches to the design and management of large-scale technological systems within firms in the nineteenth and early twentieth centuries.⁹⁶ What set the giant post-World War II projects apart from the earlier examples of the systems approach is that the war-time projects went beyond the individual firm.

The post-World War II projects like Atlas and Polaris were giant government-sponsored projects that required the skills and manpower of several private firms working simultaneously on interdependent facets of the project. The scientists, engineers, and management specialists who devised the techniques for designing and managing such large and complex projects like Atlas and Polaris got their initial experience during World War II. The Manhattan Project was famous for developing and building the atom bomb in an amazingly short time, but the systems approach really began with the wartime necessity of coordinating the procurement, production, shipment, and distribution of an unprecedented volume of ordnance and other military supplies and of building the facilities to do so. Participants in the development and management of America's successful ordnance production programs credited their successful efforts to experiences gained on the large federal dam construction projects of the 1930s, which were also government sponsored and involved several firms working simultaneously toward the completion of the larger project.⁹⁷

The Richmond assembly plant has an interesting tangential connection to these developments because it was part of the Ford Motor Company's technological system. As described in the previous chapters, the company had already developed its own complex system within the firm. During the war, Ford participated with many other firms in the much larger government-sponsored projects aimed at supplying the Allied armies, navies, and air forces with the supplies needed to emerge victorious. One young systems manager came out of that experience to take a job at Ford, developing a reputation sufficient to entice newly-elected President John F. Kennedy to name him Secretary of Defense in 1961. Kennedy chose Robert McNamara to be Secretary of Defense in order to apply systems analysis and systems management to the entire Department of Defense. From there, the methods spread to other federal bureaucracies and to state and local governments, fostering the short-lived belief that, if America could put a man on the moon, the nation could use the same methods to solve its

Management and Engineering, World War II and After (Cambridge, MA: The MIT Press, 2000). On the application of the systems approach to social problems, see Marvin Berkowitz, *The Conversion of Military-Oriented Research and Development to Civilian Uses* (New York: Praeger Publishers, 1970); Robert H. Haveman, *Poverty Policy and Poverty Research: The Great Society and the Social Sciences* (Madison: University of Wisconsin Press, 1987).

⁹⁶ James R. Beniger, *The Control Revolution: Technological and Economic Origins of the Information Society* (Cambridge, MA: Harvard University Press, 1986); Alfred D. Chandler, Jr., *The Visible Hand: The Management Revolution in American Business* (Cambridge, MA: Belknap Press, Harvard University Press, 1977); David A. Hounshell, *From the American System to Mass Production, 1800-1932: The Development of Manufacturing Technology in the United States* (Baltimore: The Johns Hopkins University Press, 1984); Thomas P. Hughes, *Networks of Power: Electrification in Western Society, 1880-1930* (Baltimore: The Johns Hopkins University Press, 1984).

⁹⁷ Allen Schick, "The Road to PPB: The States of Budget Reform," *Public Administration* 26 (December 1966): 243-258; Dean S. Warren, "Human vs. Hardware--A Critical Look at Aerospace as an Urban Problem Solver," *Aviation Week & Space Technology* 94 (7 June 1971): 62; John E. Bokel and Rolf Clark, "Acquisition in World War II," in *The Big L: American Logistics in World War II*, ed. Alan Gropman (Washington, DC: National Defense University Press, 1997), 102.

pressing social problems.⁹⁸

McNamara graduated in the late 1930s from the University of California at Berkeley with a degree in economics and minors in mathematics and philosophy. He then went to the Harvard Business School, finishing a graduate degree in 1939. McNamara was serving as a junior faculty member at Harvard when Japan attacked Pearl Harbor. Shortly thereafter, President Roosevelt challenged the nation to build 50,000 airplanes per year to fight the war. To manage such a drastic increase in its forces, the Army Air Corps needed to train statistical control officers, and it asked Harvard to help. McNamara worked with Charles B. Thornton, a lieutenant and statistical whiz in charge of the Air Corps' statistical control program, which was intended to allow central command to know and respond to information about the status of airplanes, the conditions of the men, and the state of operations. An example of the influence Thornton and his young team of statisticians had on military decision-making came as the end of the European war approached and the American military was planning to move many of its B-17 bombers from Europe to the Pacific. Thornton's team examined the costs involved and made a convincing argument to their superiors that it would be more cost-effective to build new B-29s in the U.S. and fly them to the Pacific than it would be to try to fly the B-17s to the Pacific. Late in the war, McNamara used his statistical expertise to help Curtis LeMay's XXI Bomber Command plan the logistics of fuel supply necessary to fly B-29s from India to bases in China and then on to targets in Japan. McNamara's statistical methods were credited with increasing the flying time of planes in the XXI Bomber Command by 30 percent.⁹⁹

Immediately after the war, Thornton asked McNamara to join a team he was assembling from the statistical control unit to find work together with a large, private corporation. Thornton was able to get his team, including McNamara, hired by the Ford Motor Company. Because of their youth and their intellectual approach to decision-making, the team earned the name "Whiz Kids" shortly after they moved to Dearborn. Thornton left Ford after two years to work for Hughes Aircraft, and in 1953 he left Hughes to form Litton Industries. Meanwhile, McNamara emerged as the member of Thornton's team at Ford with the most talent and drive. The Whiz Kids' methods ruffled some feathers among the old-timers at Ford, who were steeped in the ethos of non-college-educated genius embodied in the company's founder. Nevertheless, the Whiz Kids, and especially McNamara, had the respect and support of Henry Ford II, president of the company since the war. To improve the performance of the company, McNamara's team had to effect major changes in the manufacturing division, headed by Max Wiesmyer. McNamara insisted that management decisions in manufacturing be based on statistical analysis, not on the personal relationships Wiesmyer had established with his branch plant managers. McNamara was so insistent on the new management approach, which went against Wiesmyer's personality, that Wiesmyer ended up suffering a psychological break-down in the mid-1950s. McNamara emerged victorious from the restructuring of Ford management, and the Ford Motor Company named him president in 1960.¹⁰⁰

⁹⁸ See Hughes' chapter on "The Spread of the Systems Approach" in *Rescuing Prometheus*, 141-195.

⁹⁹ Robert S. McNamara, *In Retrospect: The Tragedy and Lessons of Vietnam* (New York: Random House, 1995), 5-9; David Halberstam, *The Reckoning* (New York: William Morrow and Company, Inc., 1986), 204-205; Fred Kaplan, *The Wizards of Armageddon* (Stanford: Stanford University Press, 1991), 250-251.

¹⁰⁰ McNamara, *In Retrospect*, 10-13; Halberstam, *The Reckoning*, 206-223, 236-244.

Seven weeks after McNamara became president of Ford, on December 6th, Robert Kennedy called to ask him to meet with John F. Kennedy, the President-elect. In that meeting, JFK asked McNamara to become the Secretary of Defense. Once in office, McNamara brought like-minded systems analysts into top positions in the Department of Defense, including men like Charles Hitch and Alain Enthoven from RAND. McNamara, Hitch, and Enthoven were as disruptive of traditional ways of doing things at Defense as McNamara and the Whiz Kids had been at Ford. Based on their systems analyses, they halted many of the military's favorite new weapons projects, plowed additional resources into new weapons they believed were better suited to the needs of a modern military, and implemented new methods for managing the military services and their ever more complex weapons systems. One of the key tools of the new management methods was the computer, a technology that had been born at the end of World War II to perform the tremendous mathematical ballistics computations the army needed in support of its artillery. The computer seemed to give the systems analysts and systems engineers new powers. With these apparent new powers, many of the Defense Department's experts and contractors moved to apply their methods elsewhere in government to solve pressing social problems. They soon learned that problems in society are less easily solved by quantitative analysis than are the problems of designing and managing complex weapons systems, or of managing automobile manufacturing companies, for that matter.¹⁰¹

A. The Roosevelt Administration Mobilizes Industry for War

Much has been written about the new set of government programs and agencies the Roosevelt administration put in place to mobilize American industry for war. A mere summary will suffice here. One thing that must be noted about these programs and agencies at the outset is that Roosevelt created them on the heels of the New Deal, during which the federal government gained valuable experience in working with firms in private industry. The experience of managing multiple firms working together on giant projects has already been described. In addition the government gained valuable experience during the New Deal in protecting its programs against excess profits by firms trying to take advantage of the situation and in establishing wage and price safeguards in the face of inflationary pressures. The potentials for inflation and excess profits would be even greater during wartime, as government and industry had learned during World War I. Another pitfall both government and industry wanted to avoid was the havoc that befell the U.S. economy following World War I, when reconversion of industry to peacetime pursuits was poorly planned.¹⁰²

Several government organizations for stimulating or coordinating mobilization already

¹⁰¹ McNamara, *In Retrospect*, 13-15; Kaplan, *The Wizards of Armageddon*, 252-257; Hughes, *Rescuing Prometheus*, 160-176, 185-195; David Jardini, "Out of the Blue Yonder: The Transfer of Systems Thinking from the Pentagon to the Great Society, 1961-1965," in *Systems, Experts, and Computers: The Systems Approach in Management and Engineering, World War II and After*, Agatha C. Hughes and Thomas P. Hughes, eds., (Cambridge, MA: The MIT Press, 2000), 311-357; Davis Dye, "The Limits of Technology Transfer: Civil Systems at TRW, 1965-1975," in *Systems, Experts, and Computers: The Systems Approach in Management and Engineering, World War II and After*, Agatha C. Hughes and Thomas P. Hughes, eds., (Cambridge, MA: The MIT Press, 2000), 359-384.

¹⁰² Bokel and Clark, "Acquisition in World War II," 98-103; Burnham Finney, *Arsenal of Democracy: How Industry Builds Our Defense* (New York: Whittlesey House, McGraw-Hill Book Company, Inc., 1941), 5-8.

existed as war approached. For example, the government had created the Army and Navy Munitions Board in 1922, but it had little money or authority until 1939, when Roosevelt put it under his direct control, giving it a greater role in planning industrial mobilization programs and setting priorities for procurement contracts let by the U.S. Army, U.S. Navy, U.S. Coast Guard, and U.S. Maritime Commission. The Maritime Commission had already begun to expand the nation's ship-building capacity in the late 1930s. In May 1940, following the surrender of several European nations in the wake of Hitler's *Blitzkrieg*, Roosevelt issued an Executive Order creating the Office of Emergency Management, intended to coordinate the activities of the many government agencies that the government was creating to implement various facets of the mobilization program. He also asked Congress to authorize hundreds of millions of dollars to manufacture fighters and bombers and to build additional bases, depots, hospitals, and other physical plant needed for the anticipated expansion of the military. The burst in mobilization agencies and contracts yielded increasing dissatisfaction among industry, labor, farmers, and Congress, leading Roosevelt to try to reorganize matters. He issued a new Executive Order in January 1941, creating the Office of Production Management (OPM). In the face of continuing squabbles among top army and navy officers, industry leaders, and other interests essential to the successful mobilization of the economy for war production, Roosevelt issued another executive order on 16 January 1942, abolishing the OPM and establishing the War Production Board (WPB), to be headed by Donald Nelson, a former executive at Sears & Roebuck who had joined the Roosevelt Administration late in the New Deal.¹⁰³

To set the tone for the new agency, which he had not yet announced, and to inspire American citizens and companies to rise to the challenge, Roosevelt addressed the nation through his State of the Union Address to Congress on January 6th:

The superiority of the United States in munitions and ships must be overwhelming, so overwhelming that the Axis nations can never hope to catch up with it. In order to attain this overwhelming superiority, the United States must build planes and tanks and guns and ships to the utmost limit of our national capacity. We have the ability and capacity to produce arms not only for our own armed forces, but also for the armies, navies and air forces fighting on our side.

This production of ours in the United States must be raised far above its present levels, even though it will mean the dislocation of the lives and occupations of millions of our own people. We must raise our sights all along the production line. Let no man say it cannot be done. It must be done--and we have undertaken to do.

Only this all-out scale of production will hasten the ultimate all-out victory. Speed will count. Lost ground can always be regained--lost time, never. Speed will save lives; speed will save this nation which is in peril; speed will save our freedom and civilization--and slowness has never been an American

¹⁰³ "Guidebook to Priorities: How They Operate and Who Handles Them," *Business Week*, 20 September 1941, 43-56; "Don Nelson: The Man from Sears Goes to War," *Fortune* 24 (November 1941): 86, 153; R.A. Winnacker, "The National Emergency, July 1940 to December 1941," unpublished report in National Archives and Records Administration (hereafter cited as NARA), RG-156, Entry 654J, box 21, pp. 106-112; Gropman, "Industrial Mobilization," in *The Big L: American Logistics in World War II*, ed. Alan Gropman (Washington, DC: National Defense University Press, 1997), 18-31; Hugh Conway and James E. Toth, "Building Victory's Foundation: Infrastructure," in *The Big L: American Logistics in World War II*, ed. Alan Gropman, (Washington, DC: National Defense University Press, 1997), 204-208.

characteristic.¹⁰⁴

In his speech, Roosevelt called on the nation to expand its production goals for ordnance, increasing the goals for airplanes built in 1942 from 50,000 to 60,000 and to 125,000 in 1943, and increasing the goals for tanks to 45,000 in 1942 and to 75,000 in 1943. To arrive at those figures, Roosevelt had arbitrarily revised them upward from levels his advisors had thought attainable. Commenting on the speech, *US News & World Report* said that the figures in Roosevelt's production goals "reached such astronomical proportions that human minds could not reach around them."¹⁰⁵ Reflecting on Roosevelt's speech, Donald Nelson later wrote:

The meeting at which these figures were first mentioned was inspirational, but also rather awesome. We thought that the goals set by the President were out of the question. But the records will show that he knew his country better than we did.¹⁰⁶

According to a tally by the Automotive Manufacturers Association after the war, the automotive industry by itself made 3,250,000 airplane, marine, tank, and truck engines during the war; nearly 6,000,000 guns of various kinds (about 50 percent of the nation's total production); more than 200,000 tanks and other combat vehicles; 2,600,000 military trucks; 22,160 airplanes; and numerous other items like ammunition, rockets, helmets, water and gas cans, electric motors, etc.¹⁰⁷

During the war, the Roosevelt administration created a plethora of special agencies and government-owned corporations to manage and engage in facets of the economy. Other umbrella agencies were created to coordinate the activities of agencies managing interdependent facets of the economy. For example, the Office of Price Administration had the authority to control prices in the economy as necessary to prevent inflation. The War Labor Board had the authority to approve or disapprove of any wage increases or decreases. The Metals Reserve Corporation purchased ores and metals from neutral countries and then resold those commodities to U.S. manufacturers engaged in war production. The Defense Plant Corporation built plants for processing certain strategic materials, like aluminum, manganese, synthetic rubber, and tungsten, and then leased the facilities to private entities who operated them.¹⁰⁸

One result of the government programs aimed at diverting materials and supplies to war

¹⁰⁴ FDR quoted in Nelson, *Arsenal of Democracy*, 186-187.

¹⁰⁵ Nelson, *Arsenal of Democracy*, 187; *US News & World Report* quoted in Goodwin, *No Ordinary Time*, 313.

¹⁰⁶ Nelson, *Arsenal of Democracy*, 187.

¹⁰⁷ Automotive Manufacturers Association, *Freedom's Arsenal: The Story of the Automotive Council for War Production* (Detroit: Automotive Manufacturers Association, 1950), 199-201.

¹⁰⁸ For overviews of the various government programs established to manage the production of materiel for the war effort, see Nelson, *Arsenal of Democracy*; Gropman, "Industrial Mobilization," 1-95; Donald L. Losman, Irene Kyriakopoulos, and J. Dawson Ahalt, "The Economics of America's World War II Mobilization," in *The Big L: American Logistics in World War II*, ed. Alan Gropman (Washington, DC: National Defense University Press, 1997), 145-191.

production (coupled with price controls) was that some goods needed by the civilian population were in short supply. In an effort to keep the shortages from wreaking havoc in the market, the federal government rationed some commodities, like sugar, tires, and gasoline. Although rationing placed some hardships on the U.S. population during the war, it also should be stated that the U.S. applied a smaller proportion of its gross national product to the war effort than any of the Axis powers or our major allies. It was the position of the War Production Board that Americans were "subjected to inconvenience, rather than sacrifice." During the peak years of war production for the U.S., 1943 and 1944, the nation devoted 42 percent of its gross national product to war purposes (up from 1.4 percent in 1939). In comparison, Great Britain, Canada, and Japan each spent 51 percent of their respective gross national products on war purposes in 1944.¹⁰⁹

B. Military Production as War Approaches

The Ford Motor Company's Richmond assembly plant, although a fairly large building in its own right, was but a small cog in the United States' immense homefront system of production that supplied the nation's soldiers, sailors, and airmen with the fighting equipment needed to win World War II. That system was mobilized and managed by the ordnance programs of the U.S. Army and the U.S. Navy. The Richmond plant worked under contract to the army's Ordnance Department, an exhaustive history of which is beyond the scope of this report. A few features of that history are summarized here to provide narrative context for the work accomplished at the Richmond plant.¹¹⁰

As the United States entered the 1940s, much of the rest of the world had gone to war. Hitler had attacked and conquered Poland in 1939, and by the end of 1940 Nazi Germany controlled most of the rest of western and central Europe, including France, Belgium, Denmark, Norway, and the Netherlands. Only Great Britain remained as an obstacle to Hitler's dream of dominating Europe. Japan had conquered much of Korea, China and southeast Asia. The United States was still trying to emerge from the Great Depression, but it appeared to many in the federal government and the U.S. military that war against the Axis powers was unavoidable. Among the populace, however, feelings of isolationism were strong. Many Americans opposed going to war and opposed the military taking steps to prepare for war. In the face of this sentiment, American military planners knew that they had to make preparations for war, should it come to the U.S. They knew, among other things, that they needed to begin mobilizing the nation's manufacturing capacity to produce ordnance, the equipment armies and navies need to wage war.

¹⁰⁹ War Production Board, *Wartime Production Achievements and the Reconversion Outlook, Report of the Chairman* (Washington, DC: Government Printing Office, 1945), 1-2, quoted in Gropman, "Industrial Mobilization," 58; see also John Perry Miller, *Pricing of Military Procurements* (New Haven: Yale University Press, 1949), 24; Losman, et al, "The Economics of America's World War II Mobilization," 159-160.

¹¹⁰ For a very thorough history of the U.S. Army's diverse activities during the war, see the army's published multi-volume series, "United States Army in World War II." Two volumes in the series on the Technical Services are especially useful in documenting the history of the Ordnance Department: Constance McLaughlin Green, Harry C. Thomson, and Peter C. Roots, *The Ordnance Department: Planning Munitions for War* (Washington, DC: Government Printing Office, 1955); Harry C. Thomson and Lida Mayo, *The Ordnance Department: Procurement and Supply* (Washington, DC: Government Printing Office, 1960).

Several factors made the task more complicated in the U.S. than it had ever been before. Warfare had become much more mechanized. In addition to rifles and artillery, armies now needed tanks and other fighting vehicles, trucks of all sizes, and a wider array of communications devices, and for the first time airplanes would also play a dominant role in warfare. Moreover, the United States government did not sponsor private companies, such as Vickers Armstrong in England or Krupp in Germany that specialized in designing and manufacturing munitions. In the U.S., responsibility for design and development of ordnance fell to the army's own Ordnance Department, which then contracted for production with private companies as necessary. The U.S. Army maintained six permanent arsenals, each of which specialized in a particular class of arms or ordnance, engaging in research and development of future ordnance systems as well as production. The arsenals could meet demand during peacetime, but they did not have the production capacity to meet wartime needs. They did, however, have the capacity to provide technical assistance to private companies producing ordnance under contract. Another factor was the great scale of the impending war. During the American Civil War, the U.S. Army equipped and supplied about 1.5 million soldiers. In the First World War, the U.S. Army had about 4 million men to equip. It appeared that the scale of the Second World War would be much greater than previous wars. The U.S. Army had fought only on the North American continent in the Civil War, and mainly northern Europe during the First World War, but the Second World War was being fought on several continents. The ordnance the U.S. Army needed to supply its troops had to function reliably under several extremes of terrain and climate.¹¹¹

1. History of the Ordnance Department to 1941

During the Revolutionary War, the Continental Congress had responsibility for procurement of munitions and assigned the inspection, storing, and distribution of ordnance to particular officers in the Continental Army. The colonies did not produce much ordnance, so the Continental Congress had to rely on purchases from France, on American privateers who pirated supplies on the high seas, and on the militia and Continental Army, which captured British stores. Other than the position of the Keeper of Military Stores, the new nation maintained no ordnance function after the British surrender in 1782 until 1794 when Congress authorized the President to establish two federal arms factories: the Springfield Armory, which began producing muskets in 1795, and Harpers Ferry Armory, which began the next year. To supply the U.S. Army and the militia with guns, the government also contracted with private contractors, the most notable of whom was Eli Whitney, who convinced the army that he could manufacture muskets using interchangeable parts, a concept he and others in the U.S. had learned from French practice. Although Whitney was never able to perfect his concept in practice, the Ordnance Department, established as a permanent part of the U.S. Army in 1812, embraced his concept, and it eventually revolutionized armory practice as well as the way the army maintained soldiers' weapons in the field. Whitney's concept also carried into the private sector, where manufacturers of items like sewing machines and the McCormick reaper perfected a method that Europeans called the "American system" of manufacture. U.S. Ordnance policy thereby contributed significantly to the Industrial Revolution in the U.S.¹¹²

¹¹¹ Green, et al, *The Ordnance Department: Planning Munitions for War*, 3-13.

¹¹² Green, et al, *The Ordnance Department: Planning Munitions for War*, 14-16; David Hounshell, *From the American System to Mass Production, 1800-1932: The Development of Manufacturing Technology in the United States* (Baltimore: The Johns Hopkins University Press, 1984): 3, 28-32; Merritt Roe Smith, *Harpers Ferry Armory*

The Ordnance Department of the U.S. Army had several responsibilities during the nineteenth century. One was the design and adoption of new weapons. In this regard, U.S. Army conservatism tended to delay the acceptance of new weapons systems, such as the breech-loading rifle, which the army did not adopt until after the Civil War. Another responsibility was the inspection of arms and other ordnance produced by contractors for the military. A third was to supply army units in the field with the ordnance they needed. In part because of the United States' location on the North American continent, the capabilities of the Ordnance Department were not severely tested until World War I, when the U.S. Army had to pit its weapons against the Europeans.¹¹³

When the European war erupted in 1914, most Americans did not believe the United States would become involved. The Chief of Ordnance was concerned that should the U.S. be drawn into the war the government arsenals were ill-equipped to produce conventional ordnance on the scale that would be necessary. Furthermore, American arsenals had little capacity at all to make the tanks, large artillery, and other new kinds of ordnance that were appearing on the battlefield. Congress refused, however, to contract with private manufacturers unless they could beat the costs at the government arsenals, something that rarely happened. The only reason that American manufacturers were prepared to aid in the American war effort, when the U.S. finally entered the war in 1917, was that they had taken orders from European governments for ordnance, and those contracts yielded only limited preparedness. Moreover, the Ordnance Department did not have enough trained officers to implement a program for the supply of America's war effort. Thus, with the exception of rifles and rifle ammunition, the American Expeditionary Force depended mainly on British and French suppliers for its ordnance needs. Toward the end of the war, though, the Ordnance Department was able to greatly improve its procurement of ordnance from private manufacturers. This improvement came as a result of two new approaches: the decentralization of authority to eleven district offices around the country, and putting civilians in charge of those district offices.¹¹⁴

Col Guy E. Tripp was in charge of organizing the new system of ordnance districts. Before the war, he had been chairman of the board of directors at Westinghouse Electrical and Manufacturing Company. Tripp chose local industrialists to head the districts. Although the legal work and final approval had to take place in Washington, DC, the U.S. Army gave the district chiefs authority to conduct the preliminary negotiations that would lead to contracts with manufacturing firms in their districts. The district chiefs also supervised the work done under contract and then inspected the ordnance delivered. Because the district chiefs were acquainted, if not personally then at least in terms of professional culture, with the managers of the firms with which the Ordnance Department was doing business, the chiefs were able to foster a sense of cooperation with industry. Shortly after the Ordnance Department had put the system of districts in place, military production began to increase markedly. Although the district chiefs were not solely responsible for that performance, the Ordnance Department was impressed enough with the success of the plan that it created two more ordnance districts before the war

and the New Technology: The Challenge of Change (Ithaca, NY: Cornell University Press, 1977), 106-107; Smith, "Army Ordnance and the 'American System' of Manufacturing, 1815-1861," in *Military Enterprise and Technological Change*, ed. Merritt Roe Smith (Cambridge, MA: The MIT Press, 1985), 39-86.

¹¹³ Green, et al, *The Ordnance Department: Planning Munitions for War*, 18-20.

¹¹⁴ Green, et al, *The Ordnance Department: Planning Munitions for War*, 20-27.

ended. Following the end of the war, the ordnance districts brought their activities to a close and ceased to exist in 1919. Over the next few years, as the army reviewed its war-time programs, it realized that the system of ordnance districts had been one of the more effective developments of the war. The Ordnance Department re-established the districts in 1922.¹¹⁵

Brig. Gen. Clarence C. Williams was the Chief of Ordnance from May 1918 until 1930. In the aftermath of the war, he and other national leaders recognized that the nation had been poorly prepared, so he was determined to improve the organization of the Ordnance Department. Other segments of society sought to insulate the United States from future foreign entanglements, leading in the short term to Congress refusing to join the League of Nations and over the ensuing twenty years to minimally invest in new military equipment. In the period between 1919 and 1939, under the system of organization created by Williams, the Ordnance Department had three divisions: Administration, Manufacturing (or Industrial Service), and Field Service. The Manufacturing Division was in charge of design, development, testing, production, procurement, and inspection of all ordnance acquired by the army, whether made by the arsenals or produced under contract by private industry. When re-established in 1922, the ordnance districts fell under the direction of the Manufacturing Division. Field Service had charge of the storage, maintenance, and distribution of ordnance owned by the army. There was also a Technical Staff, comprised of officers and civilians who kept abreast of both domestic and foreign ordnance developments and who advised all the divisions. The technical staff worked most closely with the Manufacturing Division, especially in the testing of new equipment at the Aberdeen Proving Ground. Planners elsewhere in the government determined that surplus ordnance produced during and after the war as well as enemy equipment captured during the war should be stored to maintain a level of preparedness not previously sought.¹¹⁶

Budgets for the Ordnance Department between the wars are a gauge of the agency's levels of activity. In 1920, 1921, and 1922, Congress appropriated \$21 million, \$23 million, and \$13 million, respectively, for the Ordnance Department. Annual appropriations then dropped to about \$7 million for the years 1923-1927. For the next eight years, appropriations held fairly steady at about \$12 million per year before rising to \$17 million and \$18 million in 1936 and 1937, respectively. Appropriations rarely rose above 4 percent of total War Department appropriations for the years 1920-1935. Another gauge of Ordnance Department activity between the wars is employment. In 1921, as post-war activities were still drawing to a close, the department had about 4,000 military workers and over 14,000 civilian employees. The following year, those figures declined to about 3,000 military and 8,000 civilian, respectively. From 1923 until the mid-1930s, the number of military workers at the Ordnance Department held steady at about 2,500, while the number of civilian workers dropped below 5,000 in the mid-1920s and then gradually rose to about 10,000 in the mid-1930s. A third measure of Ordnance Department activity is the extent to which it met its ten-year plan, launched in 1925, to equip the U.S. Army with new weapons. The army had set itself fairly modest goals, such as re-equipping itself with artillery. By 1933, however, it was only halfway to its goal for the 75-mm howitzer and the 3-inch antiaircraft gun and a third of the way there for three other kinds of artillery. For five other kinds of artillery, the army had yet to receive any weapons or, in some cases, even to receive

¹¹⁵ Green, et al, *The Ordnance Department: Planning Munitions for War*, 26-27; Levin H. Campbell, Jr., *The Industry-Ordnance Team* (New York: Whittlesey House, 1946), 18.

¹¹⁶ Green, et al, *The Ordnance Department: Planning Munitions for War*, 26-27, 30-34.

appropriations to have the weapons made.¹¹⁷

As noted above, appropriations for ordnance began to increase somewhat after 1935. President Franklin D. Roosevelt was growing concerned by hostile conditions brewing abroad, and he began to forcefully urge Congress to appropriate sufficient funds to allow the U.S. Army to correct the ordnance deficiencies it had identified. Congress authorized \$24 million for fiscal year 1938, since the situation in Europe appeared to grow even more grave. FDR sent Congress a special message in January 1938 itemizing additional weapons and other ordnance the nation's military needed to prepare for possible war, and he also asked the army to prepare a mobilization plan, accompanied by an estimate of what it would cost to implement. Congress appropriated \$112 million for fiscal year 1939, which the army was able to begin spending in July 1938. The funding allowed so great an increase in Ordnance Department activity that Assistant Chief of Ordnance, Brig. Gen. Earl McFarland recalled in 1950 that the war had actually begun for the Ordnance Department in 1938. Based on the army's estimates, Roosevelt requested and received from Congress in 1939 an appropriation of \$477 million for fiscal year 1940, most of which was allotted to the U.S. Army Air Corps to help the aircraft industry expand its industrial plant. As mentioned above, Albert Kahn designed several of the new airplane factories.¹¹⁸

In preparing for possible war and the necessary mobilization of the nation's industrial infrastructure, one of the Ordnance Department's most important tasks was to plan how it would procure needed arms, ammunition, and equipment. The department based its procurement plan on data supplied by the arsenals and the ordnance districts (now thirteen in number). Even though the ordnance districts each had only three or four people on staff during most of the inter-war period, one of the most important tasks was to survey the capabilities of firms in each district in terms of physical plant, labor, and engineering and managerial expertise. The districts had to assess the suitability of firms' resources to meet various ordnance manufacturing needs, and the districts had to update their surveys periodically. Some districts were better at keeping their surveys up-to-date, with the New York district having one of the best records. Among the data the districts collected were informal agreements from manufacturers, in the form of schedules, stating how much orders for specific quantities of military weapons or equipment would cost. By 1937, the districts had negotiated with more than 645 industrial plants to generate 2,500 such schedules. The 1939 appropriation gave the Ordnance Department the funds to allow the ordnance districts to greatly increase their staffs, which jumped from a handful of employees to dozens to as many as fifty-one in the case of the Philadelphia district. The districts immediately set to work up-dating their surveys. The surveys, coupled with expanded staffing, allowed the districts to achieve impressive results with the greatly increased number of procurement contracts they let in 1939 and 1940.¹¹⁹

Another governmental entity, the Army and Navy Munitions Board, also worked with the

¹¹⁷ Green, et al, *The Ordnance Department: Planning Munitions for War*, 40-47; Gropman, "Industrial Mobilization," 10-12.

¹¹⁸ Green, et al, *The Ordnance Department: Planning Munitions for War*, 48-49; General McFarland's recollection is cited on p. 49. See also Gropman, "Industrial Mobilization," 12-17.

¹¹⁹ Harry C. Thomson, "Organization of the Ordnance Department, 1940-1945," unpublished report in NARA, RG-156, Entry 948, box L239, pp. 8-10; Green, et al, *The Ordnance Department: Planning Munitions for War*, 53-57.

National Machine Tool Builders Association to monitor the nation's capacity to produce machine tools. The nation's manufacturers of machine tools usually operated at below capacity. That capacity was large enough to supply industrial needs during small peacetime booms, but it could not meet the anticipated demand of full industrial mobilization for war. For example, a 1937 estimate showed that with mobilization the U.S. Army would require more than 20,000 additional lathes, 16,000 of which would be needed by the Ordnance Department. With increased staffs after 1939, the ordnance districts began to report shortages of machine tools at the plants producing weapons, ammunition, and equipment under the new contracts of 1939 and 1940. The nationwide shortage of machine tools was the major bottleneck preventing contract schedules being met under the expanded program of ordnance production in 1939 and 1940, and the problem continued for some time after the U.S. entered the war following the attack on Pearl Harbor.¹²⁰

Another program that helped the nation's industrial firms prepare to mobilize for war was the Educational Orders Act of 1938, in which Congress appropriated \$2 million in additional funding for the Ordnance Department to place small orders with companies, principally to give them experience in manufacturing munitions. The act authorized the Secretary of War to solicit bids from firms for educational orders and to award orders to firms not on the competitiveness of their bids but rather on their capability, in the secretary's judgement, to undertake large wartime contracts. The Ordnance Department awarded the first four educational orders in 1939 to Winchester Repeating Arms Company of New Haven for M1 rifles, to R. Hoe & Company of New York for recoil mechanisms for 3-inch anti-aircraft guns, to S.A. Woods of Boston for machining 75-mm artillery shell casings, and to American Forge Company of Chicago for casting 75-mm artillery shell casings. In 1939, Congress authorized an additional \$32.5 million for educational orders. In 1939 and 1940, the Ordnance Department placed seventy-six more educational orders, most of them for ammunition. After February 1940, the department also started awarding contracts for production studies. These were smaller contracts that gave firms the opportunity to study what was involved in producing ordnance for the military.¹²¹

Hitler's Germany invaded Poland on 1 September 1939, and two days later England and France declared war on Germany. On 8 September, President Roosevelt declared a state of limited emergency, authorizing the U.S. Army to build itself up to full strength. About the same time, the Ordnance Department put in place a \$6 billion plan to meet its procurement responsibilities under the Protective Mobilization Plan for the army. As the Ordnance Department continued placing orders with private firms for materiel, those and many other American firms began doing a brisk business with the French and British armies, which desperately needed weapons and equipment. Indeed, in 1939 and 1940, American companies produced more weapons, ammunition, airplanes, and other military equipment for foreign armies than they did for the U.S. Army. Concerned that such a large volume of sales might endanger U.S. neutrality, Congress passed legislation in November 1939 requiring that all sales be for cash. In spring 1940, Nazi Germany conquered Norway, Denmark, Belgium, and the Netherlands, and in May, Hitler's army invaded France. Although the American public and Congress still hoped to avoid war, Congress recognized the growing threat and appropriated

¹²⁰ Lucius D. Clay, "The Army Supply Program," *Fortune* 27 (February 1943): 96-97, 225-232; Green, et al, *The Ordnance Department: Planning Munitions for War*, 56-57.

¹²¹ Green, et al, *The Ordnance Department: Planning Munitions for War*, 57-59; Bokel and Clark, "Acquisition in World War II," 103-104.

hundreds of millions of dollars for ordnance procurements. With the increased appropriations, the Ordnance Department also developed procedures to hasten negotiation and execution of contracts with private firms. France surrendered in July 1940, and the following June Hitler invaded the Soviet Union. Each worsening situation in Europe led to greater appropriations and calls for more speed in mobilizing the U.S. Army and in mobilizing industry to meet the military's needs.¹²²

Several other programs implemented by the United States government also acted to spur the mobilization of industry and to alter the stores of ordnance available to the U.S. Army. As the German army approached the English Channel and the British effected the evacuation of their troops at Dunkerque, most of the British equipment had to be left behind in France. President Roosevelt and his military advisers decided to designate old ammunition and obsolete equipment as surplus so that it could be given to Britain to replace some of its lost materiel. Within two months, the U.S. shipped vast quantities of guns and ammunition to Britain to aid in the island's defense. This action made shortages for the U.S. Army more acute, but the Ordnance Department addressed the problem by accelerating procurement. At the same time, American firms continued to make equipment for the British Army, which differed from what the U.S. Army used. By autumn 1940, Britain agreed to accept American designs for ordnance, thus streamlining American industries production of materiel for both armies. When Britain ran out of cash to purchase American ordnance, Congress passed the Lend-Lease Act, and the United States started financing British purchases. Even though most items now being produced were standardized, whether for the Allied war effort or for equipping and training U.S. troops, the two delivery streams complicated matters for the Ordnance Department, stimulating more steps to manage production more efficiently.¹²³

Throughout this period, one of the greatest impediments to American industry meeting the demand of the Ordnance Department and the British Purchasing Commission continued to be the shortage of machine tools, demand for which was about twice what American machine-tool makers could produce. Shortages in machine tools in turn led to delays in the delivery of ordnance, especially small arms ammunition. In an effort to respond to the shortage, the machine tool industry greatly expanded its capacity in the early 1940s, with half of the financing for expansion coming from the industry itself. In 1940, the industry produced less than \$500,000,000 in machine tools; by 1942 it was able to produce more than \$1 billion in machine tools. Ordnance also worked with industry to locate existing machine tools that were under-utilized and could be diverted *in situ* to war production. Ten of the thirteen Ordnance Districts established Machine-Tool Panels to locate such machine tools and redistribute (not physically but in terms of task assignments) them to work on Ordnance contracts, often by means of sub-contracts.¹²⁴

¹²² Green, et al, *The Ordnance Department: Planning Munitions for War*, 65-69; Gropman, "Industrial Mobilization," 18-20.

¹²³ Green, et al, *The Ordnance Department: Planning Munitions for War*, 72-80. For a general overview of the Lend-Lease Program, see Marcus R. Erlandson, "Lend-Lease: An Assessment of a Government Bureaucracy," in *The Big L: American Logistics in World War II*, ed. Alan Gropman (Washington, DC: National Defense University Press, 1997), 265-292.

¹²⁴ Green, et al, *The Ordnance Department: Planning Munitions for War*, 76; Campbell, *The Industry-Ordnance Team*, 133-143.

Overall organization of the Ordnance Department had not changed since 1920. It still featured four sections, the General Office, Technical Staff, Industrial Service (which supervised procurement and production), and Field Service (which supplied army units with what they needed). The Industrial Service was the largest of the sections, especially with industry mobilizing for war. In 1940, Maj. Gen. Charles M. Wesson was Chief of Ordnance. As the demands for industrial production grew, Wesson decided to de-emphasize research and development in favor of bolstering the management of production. He therefore broke the Industrial Service into three operating units, putting a colonel in charge of each. He named Col. Burton O. Lewis assistant chief for production and procurement, transferred Col. Gladeon M. Barnes from being chief of the Technical Staff to serve as assistant chief of the Industrial Section for engineering, and named Lt. Col. Levin H. Campbell, Jr. assistant chief for facilities. These three men each held the informal title of vice president within the Industrial Service, titles in keeping with Wesson's sense that Ordnance had come to resemble a giant corporation. The vice presidents supervised the expansion of their respective units from 1940 onward. The Ordnance Department maintained this structure through 1942 with only moderate change. The most important changes occurred in July 1941, when Wesson abolished the Technical Staff entirely, distributing its tasks and staff among the units of the Industrial Service. Technical Staff functions went primarily to Barnes' division, and his title changed to assistant chief for research and engineering. Wesson also added a division and a fourth vice president: Brig. Gen. Richard H. Somers became assistant chief for inspection, having charge of testing at Ordnance proving grounds and of all inspection work conducted by the Industrial Service.¹²⁵

2. The Ordnance Department During World War II

General Wesson's term as Chief of Ordnance expired in spring 1942, and President Roosevelt replaced him with Gen. Levin H. Campbell. A 1909 graduate of the U.S. Naval Academy, he resigned from the Navy to work in private industry before re-enlisting as an officer in the army. He served in the Ordnance Department during World War I and then continued at various Ordnance postings during the 1920s and 1930s working on the engineering and production of artillery, tanks, and ammunition. He received praise for successfully introducing automatic machinery to the artillery ammunition assembly line at the Frankfort Arsenal in 1939 and 1940. As assistant chief for facilities in the Industrial Service, he supervised the planning and construction of new Ordnance plants. When he was promoted to Chief of Ordnance in May 1940, Campbell not only shuffled some of the administrators in the department, but also he reorganized it in some significant ways. He appointed an advisory staff comprised of four prominent industrialists: Bernard Baruch, who had chaired the War Industries Board during World War I; K.T. Keller, president of Chrysler Corporation; Benjamin F. Fairless, president of U.S. Steel; and Lewis H. Brown, president of Johns-Manville Corporation. He also established three new operating divisions at the level of the Industrial Service and the Field Service: Military Training, Technical, and Parts Control divisions.¹²⁶

Campbell also reorganized the Industrial Service, now called the Industrial Division and

¹²⁵ Thomson, "Organization of the Ordnance Department, 1940-1945," 1-2, 11-13; Green, et al, *The Ordnance Department: Planning Munitions for War*, 83-88.

¹²⁶ Thomson, "Organization of the Ordnance Department, 1940-1945," 22-23; Green, et al, *The Ordnance Department: Planning Munitions for War*, 95-96.

under the supervision of Maj. Gen. Thomas J. Hayes. By the time he had become Chief of Ordnance, each of the four divisions had developed staffs, he believed, that could manage their responsibilities without needing the supervision of assistant chiefs. Another change Campbell inaugurated for the Industrial Division was to decentralize some of its supervisory offices. One such decentralized office he created was the Field Director of Ammunition Plants (FDAP), which he located at St. Louis next door to the office of the St. Louis Ordnance District. The FDAP had administrative charge of some sixty ammunition factories that were owned by the government and operated by contractors. Another decentralization was even more consequential. In July 1942, the U.S. Army decided to transfer all automotive activities to the Ordnance Department. Heretofore, development, production, distribution, and maintenance of the army's cars and trucks and related components like engines, transmissions, and axles had been the responsibility of the Quartermaster Corps. Combat vehicles like tanks, armored cars, and personnel carriers, on the other hand, had been the Ordnance Department's responsibility. Campbell combined the two streams of procurement under a new Tank-Automotive Center (T-AC) headquartered in Detroit. The overhauled organizational structure Campbell gave the Ordnance Department served to administer ordnance production totaling more than \$1 billion per month by December 1942.¹²⁷

Prior to the army's administrative reorganization of tank and automotive procurement, the Quartermaster Corps had also been in the midst of a tremendous procurement program (see section below describing the development of the jeep). Between July 1940, when the Quartermaster Corps reorganized to create a Motor Transport Division, and August 1942, when the duties of procurement and maintenance were shifted to Ordnance's Tank-Automotive Center (T-AC) in Detroit, the number of trucks in the U.S. Army increased from about 20,000 to about 500,000. By that time, the Motor Transport Division had been reorganized as the Motor Transport Service, and there was talk within the War Department of making the Motor Transport Service a separate branch of the U.S. Army (a shuffle recommended by Gen. Dwight D. Eisenhower). Although officials of the Quartermaster Corps argued against transferring Motor Transport away from their control, the army ordered that procurement and maintenance of motor transport vehicles be moved to Ordnance.¹²⁸

The transfer of the Motor Transport Service from the Quartermaster Corps and its merger with the Tank and Combat Vehicle Division of Ordnance's Industrial Division was easily the most monumental change made to the division's responsibilities during the war. The Motor Transport Service had charge of the army's motor pools, automotive supply depots, and schools for training auto mechanics. In addition, the Motor Transport Service administered more than 4,000 contracts worth about \$3 billion, which had to be folded into Ordnance's already mammoth list of contracts. General Campbell established the new T-AC at Detroit so that it could readily coordinate with the nation's auto industry. He wanted to avoid too much concentration of Ordnance activities at the nation's capital, and he wanted to develop the best possible relationships with auto industry leaders. After a false-start in organizing the top leadership at the T-AC, Campbell placed Brig. Gen. A.R. Glancy in charge with Brig. Gen. John K. Christmas as his deputy. Glancy was an industrialist with experience in military procurement. He received a reserve commission to become a brigadier general. Christmas had spent most of his career in the

¹²⁷ Thomson, "Organization of the Ordnance Department, 1940-1945," 23-24, 46-57; Green, et al, *The Ordnance Department: Planning Munitions for War*, 98, 106-108.

¹²⁸ Vernon Carstensen, "Motor Transport under the Quartermaster General, 1903-1942," unpublished historical report in NARA, RG-92, Records of the Quartermaster General, Entry 2116H, Box 1, p. 75-77, 167-181.

army designing and engineering tanks. Glancy organized the Detroit operation into five branches: Development, Engineering, Manufacturing, Supply, and Maintenance.¹²⁹

Nearly all the functions of the Ordnance Department were represented in the Detroit office, a fact recognized during the course of the war by the renaming of the center as Office, Chief of Ordnance-Detroit (OCO-D). Campbell was so intent on decentralization that he intended to assign full operating authority to OCO-D, although some of the divisions in Washington, DC, had difficulty relinquishing authority. This caused some inefficiency and discord within the Ordnance Department during the war, but afterward officers in the department generally considered the experiment in decentralization of the Tank-Automotive Center to have been a success, to which the tremendous production of military vehicles was largely attributable. During the course of the war, nearly half of the Ordnance Department personnel moved to Detroit. The staff there grew from forty officers and about 600 civilians in September 1942 to 500 officers and nearly 4,000 civilians by February 1943. At the peak of employment, 5,000 civilians worked at OCO-D, which was responsible for the manufacture of more than three million military vehicles. OCO-D spent almost half of the Ordnance Department's total expenditures during the war.¹³⁰

Another of Campbell's important organizational changes occurred at the level of the ordnance districts. Civilian chiefs headed the district offices from World War I to 1942. Although the chiefs were prominent industrialists, they were also volunteers who did not work full time at their district offices. With industries and their managers being more taxed to meet military production demands and with the district offices facing greater work loads in administering procurement at the local level, Campbell decided to assign experienced Ordnance officers as district chiefs, retaining the former civilian chiefs as policy advisors.¹³¹

Ordnance contracted with firms for many kinds of items beyond combat vehicles, such as were processed by Ford's Richmond branch, or weapons.¹³² Through the San Francisco Ordnance District, for example, Ordnance contracted with such firms as Rogers Super Tread Tire Service of Yakima, Washington. Founded in 1936, the father-and-son firm owned a small tire recapping plant. Specializing in tires for large construction equipment, their business grew and was in position to be low bidder on an Ordnance contract in 1942 to recap tires for the contractors that were building military installations in Alaska. The army then awarded Rogers contracts and sub-contracts for recapping tires for military vehicles. Rogers processed tens of thousands of tires throughout the war. During the peak of its work in 1944, Rogers had as many as eighty men working in its union shop.¹³³ Another example was American Box Corporation, a

¹²⁹ Green, et al, *The Ordnance Department: Planning Munitions for War*, 108-110.

¹³⁰ Green, et al, *The Ordnance Department: Planning Munitions for War*, 110-113.

¹³¹ Green, et al, *The Ordnance Department: Planning Munitions for War*, 105-106.

¹³² The National Archives in College Park, MD, RG-156, Entry 646, holds an extensive collection of contractor's histories prepared by the various Ordnance Districts. The summaries following are just a small sample.

¹³³ D.M. Middlekauf, "Rogers Super Tread Tire Service," unpublished historical report dated 6 February 1946 in San Francisco Ordnance District, Addenda to Industrial Division, Tank-Automotive Branch, Contractors' Histories, NARA, RG-156, Entry 646, box A603, contractors' histories file.

company representing the merger of several California-based box and lumber companies, the oldest being the Stockton Box Company of Stockton, founded in 1910. American Box's stock in trade was wooden boxes used for shipping fresh, dried, and canned fruits and vegetables. The company also produced some industrial boxes. American Box's first military contract was with the Quartermaster Corps in 1941, when the company helped the corps design wooden foot lockers for use in military training camps and then produced 136,666 of the items. American Box was soon under contract to build boxes for Ordnance as well, including more than a million boxes for transporting artillery munitions, bombs, and small arms.¹³⁴

The San Francisco Ordnance District created its Historical Section in 1942 in response to Ordnance Department order no. 337 dated 21 September 1942. District Chief Colonel Harmon instructed the members of his Historical Section:

The San Francisco Ordnance District has been charged with compiling a complete history of the District's activities since its inception. This history will be a factual record and will not only be a laudatory account, but will include known mistakes, their elimination, and suggestions for improvement in any phase where the need is apparent.¹³⁵

The District Historian wrote and directed the writing of numerous historical summaries that chronicle the histories of the many activities supervised by the district. These histories, and those of other Ordnance Districts, comprise several large series of records in the National Archives' Record Group 156, the Records of the Office of the Chief of Ordnance. To compile the histories, the District Historian had commanding officers at various installations write monthly and quarterly historical reports; dispatched employees on assignments, like the trip Fern Hurley made to the Richmond Tank Depot to interview workers and write a chapter on the depot in her report, "Women Man the Battle Stations" (see section on women below); and wrote letters to contractors asking them to write brief histories of their activities under contract to Ordnance during the war (Rogers Super Tread and American Box are two examples). Actual primary documents are not always included in the histories, but often the historian had typed copies of primary documents appended to reports as exhibits. The histories related to the Richmond Tank Depot comprise a significant portion of the documents cited in this HAER report. There is considerable additional information available in the histories on other aspects of Ordnance activities during World War II.¹³⁶

C. Ford's Conversion to War Production

¹³⁴ Walter S. Johnson to Col. K.B. Harmon, letter dated 21 November 1944, and Johnson, "American Box Corporation Report on Army Ordnance Production," both in I. Engle, "Contractors' Histories," undated historical report in San Francisco Ordnance District, Ammunition - Small Arms Branch, Contractors' Histories, NARA, RG-156, Entry 646, box A603, contractors' histories file, pp 10-23.

¹³⁵ K.B. Harmon to "Gentlemen," letter dated 10 November 1942, exhibit A, p 4 in I. Engle, "Contractors' Histories," undated historical report in San Francisco Ordnance District, Ammunition - Small Arms Branch, Contractors' Histories, NARA, RG-156, Entry 646, box A603, contractors' histories file.

¹³⁶ I. Engle, "Contractors' Histories," undated historical report in San Francisco Ordnance District, Ammunition - Small Arms Branch, Contractors' Histories, NARA, RG-156, Entry 646, box A603, contractors' histories file, pp 1-3.

One of Ford's first big military contracts was for the production of Pratt & Whitney aircraft engines. The company signed a contract with the government in October 1940 to build a new facility costing \$23,000,000 at the Rouge plant to manufacture 4,236 engines. In December 1940, as the building was nearing completion, Ford executive Sorensen reported to the government that machine tools were slow in arriving, delaying Ford's ability to adapt other tools to the new task and ultimately to produce engines. A year later, as the U.S. formally entered the war, the Office of Production Management reported that the Ford aircraft engine plant still had only about 28 percent of the machine tools it needed. Labor shortages also prevented Ford from meeting its schedule. Even as Ford was training young men in the skills necessary to make aircraft engines, draft boards were taking them into active military service. Increases in production also left Ford short of experienced foremen. Difficulties with unions also slowed production, as men facing strenuous production schedules filed grievances and initiated work slowdowns and strikes. Despite such difficulties, Ford completed its initial contract for aircraft engines in October 1942, by which time it was producing about 800 units per month. Yet the government wanted Ford to increase its output to 3,400 engines per month. The Rouge plant did not have the capacity for production at that scale. In an effort to meet the government's wishes, Ford assigned the production of some parts to plants elsewhere in the country, and the company steadily worked to increase productivity. As the first contract was being completed, it took Ford workers 2,331 hours to build an engine. By the end of 1944, Ford workers could make an engine in only 1,028 hours. During the war, Ford's Rouge plant produced 57,851 aircraft engines, 7.2 percent of the national total.¹³⁷

Perhaps Ford's most famous ordnance factory during WWII was the plant at Willow Run, near Ypsilanti, built to produce B-24 bombers, or Liberators. Ford began construction of an entirely new plant in March 1941. Cost of the new building and equipment was \$47,600,000. By May 1942, 15,500 employees worked there, 1,874 of them women. The contract schedule called for the Willow Run plant to make parts for 405 airplanes per month. Ford would initially ship parts for 100 bombers to a Douglas assembly plant at Tulsa and parts for 155 to a Consolidated Aircraft plant at Fort Worth. Ford would assemble the remaining 150 Liberators monthly at Willow Run. Eventually, Ford was to assemble most of its planes at Willow Run. The plant shipped its first parts to Tulsa in July 1942. The first assembled plane to fly away from the Willow Run plant departed two months later. By January 1943, Willow Run employed 30,000, of whom 10,000 were women. Thereafter, men were leaving Willow Run's workforce at a greater rate than Ford could hire them. Some were entering military service. Many other men, and women as well, quit because there was insufficient housing near Ypsilanti and the commute from Detroit was too taxing. At the peak of employment, the Willow Run bomber plant employed about 47,000 workers, and outside factories supplying Willow Run with parts employed another 22,000. Willow Run's peak month of production was August 1944, when it made 428 Liberators. By June 1945, the plant had assembled 6,791 B-24s and sent parts for an additional 1,893 bombers to other assembly plants.¹³⁸

As a company with numerous plants abroad, Ford was involved in war production elsewhere as well. The Ford Motor Company of Canada, Ltd., for example, had begun

¹³⁷ "Speeding National Defense," *Ford News* 21 (April 1941): 87; "Defense Projects Progressing Rapidly," *Ford News* 21 (July 1941): inside front cover; Nevins and Hill, *Ford: Decline and Rebirth, 1933-1962*, 200-203.

¹³⁸ "Speeding National Defense," *Ford News* 21 (April 1941): 87; "Ford Looks Forward to 1942," *Ford News* 21 (October 1941): 257; Nevins and Hill, *Ford: Decline and Rebirth*, 208-226.

negotiations with the Canadian Department of National Defense in 1938 to prepare for possible full mobilization in the event of war. When the war started in 1939, the Ford plant at Windsor, Ontario, converted nearly its entire capacity to producing military vehicles for Britain and its allies, and it quickly became the largest single source of military transport vehicles for the armies of Britain and its former colonies, like Canada, Australia, and South Africa, which soon joined Britain in the war. The Windsor plant employed 11,000 workers, and by March 1941 they had produced more than 50,000 vehicles for the military, including light trucks, heavy-duty tractors for pulling artillery and tank carriers, and a tracked vehicle called the universal carrier, used for transporting troops. One assembly line at the Windsor plant continued to produce civilian cars and trucks to help keep Canada's industrial capacity moving.¹³⁹

Although one of America's "big three" automakers at the time, Ford did not produce as many military vehicles during WWII as did the other two. For example, while Chrysler produced more than 20,000 tanks and tank destroyers, and GM's Fisher Body produced more than 16,000 tanks, Ford produced only 1,683 M-4 tanks and 1,035 M-10 tank destroyers. During the war, U.S. manufacturers produced 2,665,196 vehicles, of which Ford made 387,737 (14.5 percent). Ford's contributions were not necessarily in the nature of finished vehicles, as was the case in America's peacetime auto industry. Rather, much of Ford's productive capacity was devoted to other facets of the larger system of ordnance production. In addition to aircraft engines and bombers, Ford made nearly 27,000 tank engines, which it then shipped to other companies' assembly plants. Ford produced steel armor plate for other ordnance projects. And two of Ford's branch assembly plants, Richmond and Chester, served as tank depots, receiving tanks from other manufacturers, outfitting them with communications equipment and armament, and preparing them for shipment to overseas battlefronts.¹⁴⁰

After Japan attacked Pearl Harbor and the U.S. declared war on Japan, President Roosevelt asked Americans for an all-out effort to win the war. From Americans working in industry he asked a seven-day work week. He asked that existing plants be expanded, and he asked that new plants be built. Even though Ford and the other automobile manufacturers were already producing vehicles, aircraft engines, and artillery shells, the government asked them to speed production on those contracts so that new contracts could be entered. Government agents also asked companies to embark on projects to produce new kinds of equipment. For example, twelve days after Pearl Harbor, representatives of the National Defense Research Committee showed preliminary plans for an amphibian jeep to officials of the Ford Motor Company at Dearborn, asking the company to develop the concept into a workable vehicle. Ford agreed, further engineered a small three-man vehicle that could travel on land or water, and tested it to the army's satisfaction in the Huron River. In June 1942, Ford received a contract to produce 5,000 of the novel vehicles.¹⁴¹

As Ford and the other automakers had been preparing for war by turning ever greater portions of their productive capacity to military production, the government also began imposing quotas on the numbers of passenger cars and light trucks the companies could make. In January

¹³⁹ "Ford of Canada Aids the Empire," *Ford News* 21 (March 1941): 62-63.

¹⁴⁰ Nevins and Hill, *Ford: Decline and Rebirth*, 204-205.

¹⁴¹ Nevins and Hill, *Ford: Decline and Rebirth*, 197-198.

1942, the War Production Board issued an order that all production of civilian cars and trucks must cease. The last Ford car for private use rolled off the assembly line on February 10th.¹⁴²

The elimination of civilian auto manufacturing freed Ford's extensive system of branch plants for other uses in the war effort. At the beginning of the war, Ford had thirty-four domestic branch plants, of which sixteen were assembly plants and eighteen were units in the parts distribution network. During the war, Ford operated only fifteen of the branch plants, selling or leasing the rest to the government, which in turn put the branch facilities to other uses in the nationwide system of ordnance manufacturing, often to be operated by contractors. Ford also owned three old branch plants that were not in use at the beginning of the war; these it leased to aircraft manufacturers. On the West Coast, for example, Ford leased the plant at Long Beach to the government and sold the plants at Portland and Seattle to government. The only plant on the West Coast that Ford continued to operate during the war was in Richmond. Elsewhere in the country, Ford converted the branches at Kansas City and Memphis to its Pratt-Whitney aircraft engine program. The Chicago branch assembled armored cars. The Twin Cities branch was part of both the aircraft engine and armored-car assembly programs. The Dallas, Edgewater, and Louisville branches made trucks for military transport, and those three plus the Richmond plant participated in Ford's contract to build jeeps. Ford operated the Richmond and the Chester branches as tank depots under contract to the Ordnance Department.¹⁴³

The Ford branch at Somerville, Massachusetts, had one of the unique contracts in the Ordnance Department's nationwide system. The plant was the only one in the U.S. to build universal carriers, and it did so during the entire war. As previously mentioned, the Ford Motor Company of Canada was already producing universal carriers at the Windsor plant according to a British design for the British Army. The Windsor plant could not meet the demand, so the Ordnance Department began negotiations in February 1942 to convert the Somerville branch to carrier production. The Ordnance Department gave Ford engineers some latitude in studying the design of the carrier, both to improve its performance and to expedite production. At the end of the summer, Ordnance approved Ford's changes and in September contracted with Ford to build 21,000 universal carriers of the modified design. The original carrier was designed by Vickers-Armstrong, Britain's ordnance manufacturer. It was little more than a small steel box that held two soldiers and a machine gun sitting on caterpillar tracks and powered by a Ford Model-T engine. Vickers-Armstrong redesigned the vehicle to give it greater capacity and a new engine, the Ford V-8. The British used the new vehicle in many theatres of WWII as a personnel carrier, scout car, and mortar carrier. Ford's newer version featured a Ford-Mercury engine with 100 hp. It could travel at speeds up to 55 mph. British forces used it as a light armored vehicle to move machine gun and mortar crews into position. Because the vehicles were much heavier than cars and trucks, Ford had to completely remove its conventional assembly-line equipment at Somerville and design, fabricate, and install an entirely new assembly line, complete with painting systems, ovens, conveyors, and jigs. The Somerville plant produced its first universal carrier in March 1943.¹⁴⁴

¹⁴² Nevins and Hill, *Ford: Decline and Rebirth*, 198-199.

¹⁴³ Nevins and Hill, *Ford: Decline and Rebirth*, 199; "General Statement of Branch War Time Operations," unpublished report (n.d.) in HFM Acc. No. 672, Box 1, pp. 2-6.

¹⁴⁴ "The Universal Carrier," unpublished report (n.d.) in HFM Acc. No. 435, box 13, pp. 1, 8-11.

Ford's two main contracts at the Richmond branch were W-883-ORD-2676, the tank-depot contract for the processing and modification of combat vehicles, and W-374-ORD-2862, the largest of the five jeep assembly contracts at Richmond. The jeep contract ran from February 1942 to July 1945. When Ford originally entered the jeep contract with the army, it was under the auspices of the Quartermaster Corp, and the contract number was W-398-QM-11424 (later revised to W-398-QM-13538). When responsibility from manufacturing trucks was transferred from the Quartermaster Corps to the Ordnance Department in July 1942, Ford's jeep contract received the new ORD nomenclature. The tank depot contract ran from July 1942 to November 1945. During the course of World War II, the Richmond Tank Depot processed and shipped 55,904 vehicle units, or 17.2 percent of the total 324,565 vehicle units shipped by all the tank depots.¹⁴⁵

With the advent of war production at the Richmond branch, security became more serious. Security in and around the plant fell under three jurisdictions. Security on the water adjacent to the plant was the responsibility of the U.S. Coast Guard. Security on land beyond Ford's property line was under the jurisdiction of the Internal Security Command. Ford was responsible for security on its own property, but Ford's security measures had to conform to recommendations issued by the army's Plant Protection Office, based at the Presidio in San Francisco. In June 1942, Maj. Edmund Sawyer of the Plant Protection Office inspected the Richmond branch, by which time the plant employment office had fingerprinted all the employees. Sawyer made some recommendations for enhanced security, including: 1) contacting all caterers, utilities, and other companies that sent regular visitors to the plant, recommending that they fingerprint their employees and provide them with proper identification cards; 2) installing bullet-proof glass on the guardhouse at the main gate; 3) equipping guards with badges and side arms; the installation of an air-raid siren in addition to the existing fire alarm; and 4) equipping the Ford company's emergency responders with gas masks and helmets. Because the Richmond plant was owned and operated by the Ford Motor Company, of course, the Plant Protection Foreman at Richmond had to obtain authorization from Dearborn before he could implement Sawyer's recommendations.¹⁴⁶

D. Jeeps

The jeep is one of the most storied vehicles to come out of World War II. The brand still exists, and the vehicles Daimler-Chrysler now builds under the Jeep brand-name still owe some

¹⁴⁵ "General Statement of Branch War Time Operations," 15; "San Francisco Ordnance District, Vol. I, Part 3, History 1939-1942," unpublished historical report in NARA RG-156, Entry 646, box A576, p. 120; "Richmond Tank Depot, Vol. VI, October 1945," NARA, RG-156, Entry 646, box A601, p. 6; "Industrial Service Tank Depot Operations (Final Issue), January 1942 thru December 1945," unpublished report in NARA, RG-156, Entry 962, box L303, tables p. 2.

"Richmond Tank Depot," Vol. VI, October 1945, reported that the Richmond Tank Depot shipped 30 percent of the total number of combat vehicles that the U.S. sent overseas. The statistic derives from verbal communication to the commanding officer at the Richmond Tank Depot from the Office of the Chief of Ordnance - Detroit. The statistic cannot be verified, however, in tallies of vehicles processed and shipped by all the tank depots during the war, as presented in "Industrial Service Tank Depot Operations (Final Issue), January 1942 thru December 1945."

¹⁴⁶ Plant Protection Foreman to Charles Bernard, Dearborn, memorandum dated 2 June 1942, HFM Acc. No. 371, box 16, folder 4; Col. John W. Thompson to Ford Motor Company, Richmond, letter and attachments dated 25 May 1942, HFM Acc. No. 371, box 16, folder 4.

of their stylistic character to the WWII vehicle developed by the U.S. Army's Quartermaster Corps. This section describes the history of the jeep's development before providing details of the Richmond Tank Depot's role in the production of jeeps during the war.

1. The Quartermaster Corps & Motor Transport for the Army

The history of the Quartermaster Corps goes back to 1775 and the appointment of a Quartermaster General by the Continental Congress during the Revolutionary War. Thereafter, the Quartermaster Corps' organization evolved during peacetime and wars as it sought to supply the U.S. Army's material needs. It was generally responsible for procurement, storage, and transportation of supplies. It was always responsible for food, clothing, and camp equipment, and during some early periods, it was also responsible for arms and ammunition. By the end the 1930s, when much of the rest of the world had gone to war, the Quartermaster Corps had an extensive infrastructure of supply depots throughout the nation. It also had the facilities for making certain items itself, such as the uniform factory at the Corps' Philadelphia Depot. In 1939, the Corps was staffed by about 12,000 military personnel and 37,000 civilian employees, who supplied a standing army of about 200,000.¹⁴⁷

With the fall of France in 1940, Congress authorized the U.S. Army to expand to 1,400,000. More than the Ordnance Department, however, the Quartermaster Corps was prepared to supply an expanded army on short notice. The increase in staffing and procurement by the Quartermaster Corps in the early 1940s, although marked, was not as dramatic as that of the Ordnance Department, and the effort to mobilize American industry to satisfy Quartermaster needs was not so remarkable. Because of the nature of the items needed by the Quartermaster Corps, in fact, the nature of the mobilization was quite different. Whereas the Ordnance Department, for example, needed to help facilitate the expansion and conversion of heavy industry in industrialized parts of the country, often in the face of severe equipment and labor shortages, the Quartermaster Corps relied on manufacturers and suppliers who could fairly easily make the transition to production in support of the military. The Navy and the Maritime Commission needed to focus their expansion of shipbuilding on coastal areas, whereas the Quartermaster Corps could make procurements anywhere in the interior of the country. Therefore, to help relieve the stresses placed on coastal and industrialized areas by war production, the Quartermaster Corps preferentially awarded contracts, when possible, to small manufacturers operating in parts of the country that still had labor surpluses. At the end of the war, the Quartermaster Corps had 500,000 military personnel and 75,000 civilian employees.¹⁴⁸

Until 1942, as previously mentioned, the Quartermaster Corps was the organization within the U.S. Army that was responsible for providing motorized transportation. The army had purchased its first motor vehicle, an Oldsmobile passenger car, in 1903. Four years later it

¹⁴⁷ The early history of the Quartermaster Corps is summarized in another volume in "The Technical Services" series of the "United States Army in World War II," Erna Risch, *The Quartermaster Corps: Organization, Supply, and Services* (Washington, DC: Government Printing Office, 1953), 3-7.

¹⁴⁸ Risch, *The Quartermaster Corps: Organization, Supply, and Services*, 7-9, 243-282.

bought a truck.¹⁴⁹ Yet the Quartermaster General was not immediately impressed with those trial vehicles:

Tests made of automobiles for military purposes and reports received as to their utility and cost of maintenance do not argue in favor of their substitution for any of the standard means of Army transportation. These vehicles can rapidly transport persons and supplies over city streets or well-kept roads, but at the very best the cost of such transportation for army work is excessive. The high initial cost of these machines, the liability of damage to their complicated mechanism, tires, etc., with consequent disabling of the cars and frequency with which breakage or disabling accidents occur, together with the great expense of repairs, high wages of the necessary skilled chauffeurs, and their impracticability of operation over any but the best of roads and the smoothest of terrain will, it is thought, prohibit use of the existing types as a substitute for any of the present means of army transportation.¹⁵⁰

The Quartermaster General's remarks indicated, however, a recognition that the capabilities of motor vehicles could change, as indeed they did, while the Quartermaster Corps continued to purchase cars and trucks and the army sought ways to integrate them into its operations. By 1911, the army was using commercial trucks to move supplies at several of its posts, and that year the Quartermaster General put Capt. A.E. Williams in charge of two important new programs. One was to develop a truck capable of working with troops, thereby replacing horse- and mule-drawn wagons. The other was to work with manufacturers in an effort to have them make standardized trucks for the army. Given the nascent character of the automobile industry, Williams had little success in the latter program. Undaunted, he continued to have army units use various truck models in experimental field maneuvers to try to find appropriate rolls for motor vehicles. By 1913, the Quartermaster Corps was ready to issue general specifications that manufacturers had to meet in supplying the army with trucks, and in 1915, some units of the Quartermaster Corps began to organize motor truck companies, motor car companies, and motor cycle companies.¹⁵¹

With the U.S. entry into World War I, army purchases of motor vehicles increased tremendously, so the army decided to establish a new Motor Transport Corps. After the war, the army abolished the Motor Transport Corps and returned responsibility for motor vehicles to the Quartermaster Corps. Camp Holabird became the Quartermaster Corps' central spare parts depot for army cars and trucks and also housed the Quartermaster Transport School to train mechanics for keeping the army's fleet of vehicles in repair. Because of the huge surplus of vehicles left by the war, however, the Quartermaster Corps made few purchases during the 1920s. By the 1930s, most of the army's vehicles were obsolete. The army decided to eliminate horses and mules and to completely motorize its units, and the army also soon had responsibility to purchase trucks for the Civilian Conservation Corps. Limited testing for new kinds of trucks to meet those needs

¹⁴⁹ Vernon Carstensen, "Motor Transport under the Quartermaster General, 1903-1942," unpublished historical report in NARA, RG-92, Records of the Quartermaster General, Entry 2116H, Box 1, p. 1.

¹⁵⁰ *Annual Report of the Quartermaster General to the Secretary of War for the Fiscal Year Ended June 30, 1907*, 32, quoted in Carstensen, "Motor Transport under the Quartermaster General, 1903-1942," 1.

¹⁵¹ Carstensen, "Motor Transport under the Quartermaster General, 1903-1942," 2-7.

took place at Holabird.¹⁵²

Therefore, the Quartermaster Corps greatly expanded its purchasing program for motor vehicles, but not without a skirmish over the issue of standardization with the Ordnance Department, which held responsibility for purchase of combat vehicles. The Quartermaster General believed that standardization of transport vehicles throughout the army was essential to ensure effective maintenance in the field during wartime. The Chief of Ordnance advocated allowing each organization of the army to determine specifications for trucks it needed. The Quartermaster General prevailed initially, and in 1931 the army embarked on the purchase of a standardized fleet. Ordnance and the Corps of Engineers continued to resist the policy, and some manufacturers also balked at responding to bid requests, citing the new standardized specifications. The army's Comptroller General ruled in 1933 that the Quartermaster Corps' standardized specifications violated the War Department's procurement regulations, so truck manufacturers were allowed to submit competitive bids on vehicles, responding only to general specifications. By 1936, when the old fleet of vehicles had been largely replaced, Col. Brainerd Taylor, the commander at Holabird, reported to the Quartermaster General that the army owned and operated 360 distinct models of vehicles. Holabird could not maintain so many different types of spare parts, so the Quartermaster Corps' centralized system for spare parts at Holabird disintegrated.¹⁵³

Some truck manufacturers recognized the peril this situation placed upon the U.S. Army. The previous year, the Motor Transport Branch of the Quartermaster Corps convened a meeting with the Assistant Secretary of War, the Quartermaster General, several of his top assistants, and representatives of forty truck manufacturers. Several companies, including the White Motor Company, Moreland Truck Company, and the Marmon Herrington Motor Truck Company, agreed with the Quartermaster General's position that the army needed standardized trucks, but they were also cognizant of the pitfalls, articulated by a representative of the Four Wheel Drive Auto Company. He recognized that if the army conducted tests on a particular patented device and then decided to incorporate it in its standard specifications, competitors of the company that owned the patent would try to use political connections to have the specifications changed to remove the patented device. Nevertheless, some means of overcoming that competitive barrier had to be found for, as A.W. Herrington of Marmon Herrington observed,

if the kind of motor transport recently purchased for the Army were used [in the next war], it would be necessary to abandon any thought of automotive repair in the field and to adopt a policy of abandoning unserviceable vehicles and replacing them with new vehicles.¹⁵⁴

Colonel Taylor was in complete agreement with Herrington, telling the Quartermaster General that simplifying automotive repair was "one of the most important problems in modern war planning." Taylor continued to press his superiors in the hierarchy of the War Department on the need for standardization, and in 1938 Assistant Secretary of War Louis Johnson took up his

¹⁵² Carstensen, "Motor Transport under the Quartermaster General, 1903-1942," 28-35.

¹⁵³ Carstensen, "Motor Transport under the Quartermaster General, 1903-1942," 33-59; Risch, *The Quartermaster Corps: Organization, Supply, and Services*, 141-142.

¹⁵⁴ Carstensen, "Motor Transport under the Quartermaster General, 1903-1942," 63.

cause. Over the next two years, Congress, at Johnson's urging, made important progress toward authorizing the army to purchase standardized trucks. Germany's invasion of Poland in September 1939 helped to stimulate that progress. By mid-1940, many components in a system of standardization were in place, leading the army to accept a couple of kinds of trucks that were to become well-known during America's participation in World War II: the Dodge 4 x 4 1-1/2-ton truck and the General Motors 6 x 6 2-1/2-ton truck. The Quartermaster Corps made all-wheel drive the norm and established five standard chassis types for 1/2-ton, 1-1/2-ton, 2-1/2-ton, 4-ton, and 7-1/2-ton trucks. There would be certain variation in body types to accommodate particular uses, but all would be designed to minimize variability in spare parts. In order not to discourage bidders, however, higher authorities in the War

Department still allowed some minor variations in the trucks bidders could propose to build.¹⁵⁵ Against this background, the determination of the Quartermaster Corps to insist that the jeep be completely standardized can be better understood.

2. The Quartermaster Corps Develops the Jeep

The jeep had its origins in a small car designed and built by the Austin Motor Car Company of Birmingham, England, to address a European market that differed from the American market. Population density in Europe was great and gasoline prices were higher, translating into demand for a smaller automobile than American automakers produced. In 1929, the company formed a subsidiary, the American Austin Car Company, which acquired the plant of the Standard Steel Car Company in Butler, Pennsylvania. Because of the timing and the American market, however, the Austin car was not very successful, and in 1936 the American Austin Car Company was acquired by the American Bantam Car Company.¹⁵⁶

Meanwhile, the U.S. Army's Quartermaster Corps had begun looking for a small vehicle to replace the motorcycle equipped with a sidecar. The army purchased an experimental car from Austin in 1933 for tests at Fort Benning. The two-seat car was open but otherwise of conventional design. As the army tested that car, engineers at the Tank Section of Fort Benning's Infantry School began development of a vehicle called the Howie machine-gun carrier, intended to be capable of carrying a machine-gun tripod and two soldiers lying prone. The vehicle had a very low profile and traveled at a low speed. In 1937, engineers at the Quartermaster Corps' Holabird Depot ordered a new experimental version of a small vehicle from Bantam. The engineers had already developed a preliminary design, which included what would become the familiar body shape. They worked out final details with an engineer at Bantam. The specifications for the vehicle had changed: the soldiers were back in a seated position, and the vehicle had to be capable of traversing rough terrain. It still needed to be capable of carrying a machine gun on a tripod, plus ammunition. The U.S. Army wanted the vehicle to be built of conventional commercial parts. After some tests, the Quartermaster Corps ordered three more test models in 1938, one each for Fort Benning, Fort Riley, and the Holabird Depot. While the

¹⁵⁵ Carstensen, "Motor Transport under the Quartermaster General, 1903-1942," 59-74; Taylor is quoted on p. 63. See also Risch, *The Quartermaster Corps: Organization, Supply, and Services*, 142-143.

¹⁵⁶ E.P. Hogan, "The Story of the Quarter-Ton: The Army's Smallest Car Known as a 'Jeep'," unpublished historical report dated 15 July 1941 in NARA, Records of the Office of the Chief of Ordnance, RG-156, Entry 646A, box A711, p. 1; Herbert R. Rifkind, "The Jeep - Its Development and Procurement under the Quartermaster Corps, 1940-1942," unpublished historical report dated 1943 in NARA, Records of the Quartermaster Corps, RG-92, Entry 2116N, box 2, p. 6.

regular army tested those three vehicles, Bantam provided some of its cars to the Pennsylvania National Guard, in the process learning more about how its vehicles performed in military situations.¹⁵⁷

The next stage in the development of the jeep was a 1940 request for bids to supply the army with seventy experimental vehicles for further testing. This number grew out of an investigation made by a sub-committee of the Ordnance Department's Technical Committee. Because the prototype Howie machine-gun carrier was considered a combat vehicle, the U.S. Army asked the Ordnance Department to consider the 1/4-ton 4 x 4 experimental truck as a vehicle that could satisfy the requirements of carrying a machine gun and crew. Ordnance performed some tests on the earlier Bantam vehicles and on a Bantam chassis, agreeing that with modifications the vehicle could serve to carry a machine gun. The sub-committee, Colonel Howie, and Bantam engineers met in June 1940 to draw-up some new specifications. Ordnance then recommended that the Quartermaster Corps procure seventy experimental vehicles, forty to be tested by the infantry, twenty by the cavalry, and ten by the artillery. The infantry and cavalry wanted the new truck to be a vehicle with all four wheels steering, rather than the front two wheels only. Although the Quartermaster Corps opposed this feature because it would require four constant velocity joints instead of two, placing a further demand on one of the already recognized bottlenecks in producing the new vehicle, and because it would make the truck more difficult to maintain in the field, the Quartermaster General agreed to have eight of the experimental vehicles built as the four-wheel steering type. Meanwhile, Bantam worked closely with the Spicer Manufacturing Company of Toledo, Ohio, to develop stout four-wheel drive axles and transfer case for the light-weight truck, and Bantam opted for an engine made by Continental Motors that was larger than its own Bantam engine.¹⁵⁸

American Bantam proposed to negotiate a contract with the Quartermaster Corps to supply the seventy vehicles, but the corps decided it was time to start opening the process to other bidders. Only one other company submitted a bid. The bid of Willys-Overland, Inc., was lower than Bantam's bid, but Bantam received the contract because it was willing to meet the army's specifications and schedule. Although invited to do so, the Ford company did not submit a bid. Rigorous tests of the seventy Bantam vehicles at Holabird convinced the army to begin equipping its units with the new four-wheel drive 1/4-ton truck. In October 1940, the Quartermaster Corps invited bids and negotiated contracts with American Bantam, Willys-Overland, and Ford for 500 of the vehicles each, specifying that all 1,500 axles and transfer cases would be supplied by Spicer. The corps decided to enter three contracts, rather than one, because it wanted to develop production capabilities with several firms in case many more of the vehicles were needed. Other branches of the U.S. Army, as well as other government agencies, objected, however, to awarding contracts to Willys and Ford. After heated debate among the various parties, the Assistant Secretary of War authorized the Quartermaster Corps to negotiate three contracts of 1,500 vehicles each. Each of the three companies was supposed to build the vehicles identically so that army mechanics in the field would be maintaining completely standardized

¹⁵⁷ There is a nice summary of the Quartermaster Corps' development of the jeep in Risch, *The Quartermaster Corps: Organization, Supply, and Services*, 139-141. See also Hogan, "The Story of the Jeep," 1-4; Francis H. Fern (president of American Bantam Car Corporation), testimony given 6 August 1941 to the Truman Committee Investigating National Defense, HFM Acc. No. 435, box 30, Mass Jeep Shipped folder, p. 1; Rifkind, "The Jeep - Its Development and Procurement under the Quartermaster Corps, 1940-1942," 6-12.

¹⁵⁸ Rifkind, "The Jeep - Its Development and Procurement under the Quartermaster Corps, 1940-1942," 21-27.

vehicles.¹⁵⁹

The army initially referred to the small truck as a Light Command and Reconnaissance Car, intending that it compete with the standard motorized three-passenger tricycle and with the motorcycle-and-sidecar that accompanied the Nazi Panzer tank divisions. This intention was very obvious in the reports various units of the army sent back to the Quartermaster Corps as their soldiers worked with the jeeps in maneuvers. Among the questions the Quartermaster Corps asked unit commanders to consider in their reports was how the jeeps performed in various conditions and circumstances as compared specifically to motorcycles with sidecars and to motorized tricycles. The Quartermaster Corps received reports from infantry, cavalry, armored, field artillery, reconnaissance, supply, and other units, commanders of which were overall very enthusiastic about the jeeps' performance, nearly always reporting that the jeeps were superior to the motorcycles and tricycles. The feedback the Corps received from these units also helped to develop the final production specifications that were adopted in 1942, as units offered advice on minor modifications to such items as the canvas top, the side mirrors, the collapsible seats, and windshield wipers, all intended to make the jeep a more serviceable vehicle in battlefield conditions.¹⁶⁰

The three auto companies did not interpret the U.S. Army's specifications identically. The Bantam version, for example, was under the army's weight limit, while the Willys version was over the limit because it had a bigger Willys engine. Ford delivered its jeeps with Fordson farm tractor engines, necessitating a different shape to the hood. Each of the three had different shapes to the front fenders. All three versions revealed structural weakness during the tests of 1941. The army decided that the Willys model would become the standard, mainly because, although heavier than the specifications allowed, it performed better than the other two. The army next decided to let a contract for 16,000 jeeps, but this time the entire order would go to one company. The Willys bid was slightly lower than Ford's, but the Quartermaster Corps wanted to award the contract to Ford because it possessed greater production capabilities. The Office of Production Management, however, overruled the Quartermaster Corps, so the army awarded the contract to Willys. Within a few months, though, as appropriations for ordnance procurement continued to increase, it became evident that Willys could not meet the army's needs. The Quartermaster Corps negotiated an additional contract with the Ford company, which was instructed to follow the Willys drawings and specifications. During the course of the war,

¹⁵⁹ Hogan, "The Story of the Jeep," 4-8; Fern testimony, 2; Lt. Col. Edward S. Van Dusen (Quartermaster Corps), testimony given 13 August 1941 to the Truman Committee Investigating National Defense, HFM Acc. No. 435, box 30, Mass Jeep Shipped folder; Rifkind, "The Jeep - Its Development and Procurement under the Quartermaster Corps, 1940-1942," 27-34, 55-74; "Ford Motor Company Operations under GPW Reconnaissance Car Contract and GPA Amphibian Contract," unpublished report (n.d.). in HFM Acc. No. 435, box 7, FMC Operations under GPW Contract folder, pp. 1-2

Sources from the period provide inconsistent accounts of the numbers involved in the contracts for 1500 jeeps. "Ford Motor Company Operations under GPW Reconnaissance Car Contract and GPA Amphibian Contract" and Col. Van Dusen's testimony suggest that the total number was 1500 jeeps, with each of the three companies producing 500. Hogan's report, Bigger's testimony, and the Thomson and Mayo history indicate that each company contracted to make 1500 units. The latter number seems to be corroborated by the "Statistical Work Sheets, to 1 August 1945," in NARA, RG-156, Entry 936, box L181, p. 155, which shows that American Bantam supplied the army with a total of 2,642 jeeps during and prior to the war.

¹⁶⁰ Rifkind, "The Jeep - Its Development and Procurement under the Quartermaster Corps, 1940-1942," 34. The reports, typed on standardized forms, from units stationed throughout the U.S. are in NARA, RG-92, Entry 1890A, boxes 477, 478, and 479.

Ford built more than 280,000 jeeps, and Willys built about 350,000, the parts of both companies' jeeps being completely interchangeable. Bantam, on the other hand, received no further contracts to build jeeps because the army did not think the company had sufficient production capacity. Bantam's production for the army thereafter was limited to small trailers.¹⁶¹

The jeep became a staple of U.S. Army units in World War II, even though there had been considerable wrangling within the army and between the army and the competing auto companies concerning how the vehicle would be built and who would build it. Parties not participating in the bidding process also got involved in the controversies. Awarding of the three contracts for 1,500 vehicles each to Bantam, Ford, and Willys in 1940 generated controversy in the national press, especially because Ford, which heretofore had not been part of the process, was one of the companies receiving a contract.¹⁶² Then Congress investigated the Quartermaster Corps' process of contracting for jeeps in 1941. Earlier that year, the U.S. Senate had created a committee, chaired by Harry S. Truman, to investigate the national defense program and contracts the government had entered pursuant to the program. In August 1941, the Truman Committee heard testimony from the president of American Bantam and representatives of the Quartermaster Corps and the Office of Production Management concerning decisions made in awarding jeep contracts. Later that year, a sub-committee of the House Military Affairs Committee also investigated the jeep contracts. After thorough review, neither congressional committee took steps to reverse decisions made by the Quartermaster Corps.¹⁶³ Although these controversies are an interesting part of the history of the jeep, they are beyond the scope of this report.

The new vehicle quickly became very popular among soldiers and the public alike, who called it the "jeep" as a phonetic shortening of the army's classification for the vehicle, the

¹⁶¹ Fenn testimony, 2; Rifkind, "The Jeep - Its Development and Procurement under the Quartermaster Corps, 1940-1942," 95-112, 143-159; John D. Biggers (Office of Production Management), testimony given 13 August 1941 to the Truman Committee Investigating National Defense, HFM Acc. No. 435, box 30, Mass Jeep Shipped folder; Nelson, *Arsenal of Democracy*, 177-178; Harry C. Thomson and Lida Mayo, *The Ordnance Department: Procurement and Supply* (Washington, DC: 1960), 276-278; "Statistical Work Sheets, to 1 August 1945," in NARA, RG156, Entry 936, box L181, p. 155.

¹⁶² Ford Motor Company was singled out for criticism because it was seen as a giant corporation intruding on a specialty market developed by a small company, American Bantam, and because Ford still had a poor record in negotiating with organized labor (see section on labor in this report below). There was also concern that Ford was trying to use its contract to get the contract for four-wheel-drive axles taken from Spicer. I.F. Stone was especially prominent in his journalistic attacks; see I.F. Stone, "Behind the Ford Contract," *PM*, 14 December 1940; Stone, "Ford Still Gets the Breaks Even if It Does Jam Defense," appearing in both *The Nation*, 30 December 1940 and *PM*, 30 December 1940; Stone, "Army Alters 'Midget' Car to Please Henry Ford," *PM*, 19 January 1941; Stone, "Ford Contract Inquiry Urged," *PM*, 24 January 1941. Stone was also critical of the Willys contract; see Stone, "Willys-Overland Gets Army Favor on Midget Cars," *PM*, 16 February 1941. The controversy is summarized in Rifkind, "The Jeep - Its Development and Procurement under the Quartermaster Corps, 1940-1942," 76-84 and 84-95.

¹⁶³ Rifkind, "The Jeep - Its Development and Procurement under the Quartermaster Corps, 1940-1942," 112-128. Testimony before the Truman Committee is cited elsewhere in this report and may be found in HFM Acc. No. 435, box 30.

GPW.¹⁶⁴ As the war progressed, Willys began looking to the post-war potential for marketing jeeps to a civilian population. The company ran advertisements claiming that its engineers had "created and perfected the jubilant Jeep." Already resentful that it had lost the army's jeep contracts, Bantam filed a complaint with the Federal Trade Commission (FTC) that Willys' advertisements were unfair competition. The FTC investigated the history of the jeep's development, ruling in 1948 that Willys' advertisements were indeed unfair and ordering Willys to cease and desist. Within the army, on the other hand, General Campbell, Chief of Ordnance, was more gracious. Even though the Ordnance Department had contracted with Willys and Ford to manufacture hundreds of thousands of jeeps from 1942 onward, Campbell issued a statement in 1944 that the Quartermaster Corps was entitled to the credit for having developed the jeep and for having brought it into production.¹⁶⁵

3. Ford's Production of Jeeps

As described above, each of the three companies providing experimental jeeps during the 1940-1941 development period engaged in some research and development to help the army find a satisfactory design. A Ford report also indicates that Ford had hoped to build its jeeps using some of its own parts that were comparable, but not identical, to those being made or purchased by Bantam and Willys. The U.S. Army, however, was determined that all the parts of all the jeeps be interchangeable, which forced some practices upon Ford that company engineers apparently did not relish. Discussions between engineers of Ford and the Quartermaster Corps concerning jeep engines are illustrative. During the round of contracts in which each company supplied the army with 1500 vehicles, Bantam used a 112-cubic-inch engine made by the Continental Motor Company, Ford used its own 119-cubic-inch engine that it made for Ford tractors, and Willys made its own 139-cubic-inch engine. It was the Willys engine, in part, that put the Willys jeep over the weight limit for that round of production, but the army decided that it preferred the more robust Willys engine. It therefore decided the Willys engine would be standard in all jeeps. Shortly thereafter, though, when the Quartermaster Corps decided it needed to have Ford producing jeeps as well, Ford estimated it would cost \$4,000,000 to modify its Rouge plant to manufacture the Willys engine. Ford therefore proposed to use its Ford tractor engine block with larger cylinder bores. Wanting complete interchangeability in its jeeps, the Quartermaster Corps nevertheless insisted that Ford tool-up to make the Willys engines. Willys agreed to provide Ford with all plans and other documents necessary to produce the engines.¹⁶⁶

¹⁶⁴ Although other authorities attribute the name "jeep" to the phonetic contraction of G.P., Rifkind offers a more complex history in the first footnote of his "The Jeep - Its Development and Procurement under the Quartermaster Corps, 1940-1942." He reports that prior to application of the name to the "truck, 1/4 ton, 4 x 4," the 1-2-ton 4 x 4 truck was also called a jeep. During 1941 maneuvers when the army was testing the 1/4-ton truck, it was variously called "jeep," "baby jeep," and "peep." Other names included "jeepie," "son-of-a-jeep," "blitz-buggy," "bantam," and "puddle jumper." A variant of the spelling was "geep." By February 1942, soldiers and mechanics applied the name "jeep" solely to the 1-4-ton truck as the 1/2-ton 4 x 4 truck was replaced by a 3/4-ton model. "Jeep" did not attain official military status as a name.

¹⁶⁵ Thomson and Mayo, *The Ordnance Department: Procurement and Supply*, 279.

¹⁶⁶ Colonel Van Dusen testimony, 5; "Ford Motor Company Operations under GPW Reconnaissance Car Contract," 1-2; Rifkind, "The Jeep - Its Development and Procurement under the Quartermaster Corps, 1940-1942," 128-143. Rifkind provides numerous details concerning the Corps' negotiations leading to the contracts with Ford to

By the time Ford was ready to start producing jeeps in large numbers, however, the U.S. was at war, and much of the space at the Rouge plant was taken producing other ordnance for the war effort. Ford therefore proposed that the Ordnance Department allow the company to assemble jeeps at its Chester, Dallas, Louisville, and Richmond branch plants. According to a Ford analysis, this introduced a certain inefficiency to the company's overall jeep operation. The government was asking Ford to make 350 jeeps per day. One of those branch plants could have handled the task, but instead the work was spread among several plants working at less than capacity. Ford acknowledged, on the other hand, the advantage accrued to the government. Most of the jeeps were assembled on the coasts, so the government incurred less cost shipping finished vehicles to port facilities.¹⁶⁷

Ford's Rouge plant produced the first seventy-seven of the company's jeeps with Willys engines in January 1942. The following month, while the Rouge plant turned-out 1,460 jeeps, Chester, Dallas, Louisville, and Richmond branches got their jeep assembly lines underway. Chester produced 184 jeeps in February 1942, Dallas produced 197, Louisville 107, and Richmond 170. In March, all the plants were producing at about their intended capacity, and the company produced 8,920 jeeps. The following month, Ford set its overall record of jeeps produced in a single month: 11,159 vehicles. The Chester and Richmond plants also set their individual plant records in April 1942: 2,425 and 2,000 respectively. The Rouge plant ceased assembling jeeps in September 1942, with a brief resumption in mid-1943. Chester ceased producing jeeps in January 1943. The Edgewater branch assembled 1,333 jeeps in early 1943. The Dallas, Louisville, and Richmond plants continued assembling the quarter-ton trucks until the Ford contract ended in July 1945. During that period of production, Ford manufactured its own Willys engines, as well as axles, drive shafts, and some of the springs, transmissions, and bodies, at the Rouge and the Lincoln plants. It made the little bits of trim at the Highland Park plant. Ford purchased all the other components of the jeeps it made, including frames, wheels, steering gears, and brakes, from suppliers who also supplied Willys. The following table shows the totals for each of the Ford plants that made jeeps during the war:

**Ford Motor Company Jeeps in WWII
by plant¹⁶⁸**

Rouge (includes 4,458 experimental vehicles before the GPW contract)	26,017
Chester	18,533
Dallas	93,748
Edgewater	1,333
Louisville	93,364

make jeeps. For example, he describes the process by which, for the first time in the United States' mobilization of industry in support of the war effort, the government was able to include in the contract with Ford the stipulation "that all special dies, jigs, fixtures, and other tools to be acquired for the production of these vehicles will become the property of the United States" (p. 141-142).

¹⁶⁷ "Ford Motor Company Operations under GPW Reconnaissance Car Contract," 2-4.

¹⁶⁸ "Ford Motor Company Operations under GPW Reconnaissance Car Contract," 15-16A. Note that the July 1945 report by the commanding officer at the Richmond Tank Depot, "Richmond Tank Depot, Vol. V, 1 July to 30 September 1945," 16, states that Richmond assembled 49,361 jeeps and not 49,359.

Richmond

49,359

At the Richmond plant, Ford dedicated 142,000 square feet of space on the first floor to jeep assembly. The functions of the Ordnance Department's tank depot (see below) occupied 105,162 square feet on the first floor and 71,714 square feet on the second. Ford retained 92,460 square feet on the first floor and 71,411 square feet on the second for its own operations. Even though American automakers were no longer allowed to produce civilian autos, the government recognized that it was important to keep the nation's existing fleet of private cars and trucks in running order to transport workers to and from work and to transport materials. Therefore, the government allowed the automakers to keep their service parts networks operating. During the war, the Richmond plant continued to serve as a distribution point for Ford parts, not only for Richmond's service area but for those of the Long Beach and Seattle branches as well. In December 1942, about 140 workers staffed the Service Stock Department at the Richmond branch, and it handled a volume of parts about twice that of any other Ford service branch in the U.S. The remaining 16,778 square feet on the first floor and 8,875 square feet on the second served what Ford classified as mixed uses. These areas included toilet facilities and general offices that served the entire building.¹⁶⁹

When the Quartermaster Corps granted Ford the contract to assemble jeeps at Richmond, it transferred George U. McFadden there to supervise the contract. A civilian, McFadden had been posted at one of the General Motors plants in Oakland, from where he managed a large Quartermaster Corps contract with GM for trucks as well as supervising all other Quartermaster procurement contracts on the West Coast. After the army transferred procurement of motor transport vehicles from the Quartermaster Corps to Ordnance, McFadden transferred to Ordnance as well. For most of the duration of the war, his title in the Ordnance hierarchy at Richmond was chief resident inspector.¹⁷⁰ Richmond's contract to assembly jeeps actually was implemented in several phases:

**Jeeps Assembled at Richmond under Ordnance Contracts
by contract no. and date of contract**

W-374-Ord-2734	2-18-42	2,500 jeeps
W-374-Ord-2742	4-10-42	10,941
W-374-Ord-2798	11-10-42	5,410
W-374-Ord-2862	3-10-44	24,951
W-20-018-Ord-4920	2-20-45	4,423 (8,097 in original order)

¹⁶⁹ "Richmond Branch Operations under Contract W-883-ORD-2676," HFM Acc. No. 672, box 2, Defense Production - Richmond Branch folder, 8-9; Superintendent's Office to W.A. Abbott and Abbott to Supt's Office, memoranda dated 18 and 28 December 1942, HFM Acc. No. 371, box 16, folder 4.

¹⁷⁰ "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 49-50. McFadden was transferred to the San Francisco Ordnance District, Tank-Automotive Branch, as Chief Inspector in January 1945; see "Richmond Tank Depot, Vol. III, 1 January to 31 March 1945," NARA, RG-156, Entry 646, box A600, 10.

Total	49,225 jeeps ¹⁷¹
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As the above table suggests, the last contract was originally for 8,097 jeeps, but when the contract was terminated on 28 July 1945, the last several thousand jeeps were cancelled along with the contract. Of the jeeps assembled at Richmond, roughly 70 percent were boxed for shipment overseas and the remainder were delivered to the army on wheels.¹⁷²

Assembly of jeeps at Richmond was a fairly simple process. The plant received most components from Dearborn, including the frames, which had already received a first coat of paint there. Workers placed a frame on the assembly-line conveyor and then attached springs and front and rear axle assemblies. Then they gave the entire chassis a second coat of paint. Next they installed the engine, steering gear, transmission, transfer case, battery, wheels, radiator, body, gasoline, oil, and coolant. A Ford inspector then started the jeep for the first time and took it for a 5-mile test drive, noting deficiencies that were rectified upon return to the plant. Then Ford turned the jeep over to Ordnance for inspection and acceptance. Ordnance inspected every jeep with at least a 1-mile road test. Ten percent of the jeeps received a 5-mile test, and 1 percent received a 100-mile test. Once accepted, Ordnance returned each jeep to Ford, where it was sent to a screen room for a radio suppression test under the supervision of an Ordnance inspector. Then Ford took the jeep to the disassembly line where it was prepared for boxing. Boxed jeeps were loaded onto railroad cars for shipment to a Port of Embarkation elsewhere in the country or delivered to the Stockton Ordnance Depot, where they awaited shipment back to the San Francisco Port of Embarkation. In April 1944, McFadden received an award of \$250 from the War Department for suggesting that the Stockton Depot establish a sub-depot at the Richmond Tank Depot for jeeps eventually headed to the San Francisco Port, thus obviating a needless shipment of jeeps to Stockton and back to the Bay. In early 1945, by which time it was calculated his idea had saved about \$200,000, the War Department awarded him an additional \$560.¹⁷³

The *Richmond Independent* and local radio stations reported on 10 May 1945 that the Ford Motor Company's contract to produce jeeps would end July 31st, after which Willys-Overland would be the nation's only jeep manufacturer. Yet the Richmond Tank Depot did not receive official notice of the contract termination until May 23rd. The last jeep rolled off the Richmond assembly line on July 26th, it was boxed and ready for shipment at 3:00 pm on the 28th, at which time Ford's jeep assembly contract with Ordnance terminated. By that time, the reconversion to civilian production was well underway, and Ford announced it would begin producing civilian trucks at the Richmond branch on August 1st (see section on reconversion below). The company intended to produce 1,000 trucks of the same type it had been making

¹⁷¹ "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 49-52, 75; "Richmond Tank Depot, Vol. V, 1 July to 30 September 1945," 16-17. Note that there is a discrepancy between the total shown in this table and the total presented in a previous table for jeeps produced at the various Ford plants. The total shown here is the arithmetic total of the numbers of jeeps produced under the various contracts, according to the Ordnance sources cited. Other Ordnance sources, however, show different totals. It is not known at present which is the accurate figure.

¹⁷² "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 75; "Richmond Tank Depot, Vol. V, 1 July to 30 September 1945," 17.

¹⁷³ "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 51-52; "Richmond Tank Depot, Vol. III, 1 January to 31 March 1945," 10.

when civilian production ceased on 24 March 1942.¹⁷⁴

E. Tanks and the Richmond Tank Depot

During the sixteen years prior to 1935, the United States manufactured thirty-three tanks. Between 1935 and 1940, the nation produced 1,000 tanks. In the period 1940-1945, the Arsenal of Democracy produced 87,619 tanks, in addition to tens of thousands of other combat vehicles.¹⁷⁵ The Richmond Tank Depot was but a small component of America's huge technological system developed to manufacture fighting vehicles, but it played an integral role in that critical portion of the system between the tank factories and the Ports of Embarkation, where the army loaded tanks and other ordnance on ships and sent them overseas to U.S. Army units, U.S. Marine Corps units, and the fighting forces of England, the Soviet Union, and other Allies. This section describes the Richmond Tank Depot's role in the context of that much larger system for producing and shipping tanks and other combat vehicles.

To manufacture the combat vehicles it needed, Ordnance contracted with a wide variety of companies possessing the physical plant required, include manufacturers of cars and trucks, farm machinery, and railroad cars and locomotives. The following table lists just a sampling of the kinds of combat vehicles made and the companies that produced them:

Manufacturers of Select Combat Vehicles¹⁷⁶

Combat Vehicle	Manufacturers	Peacetime Production
M5 light tank	American Car and Foundry Cadillac, Detroit Cadillac, Southgate, CA Massey-Harris	railroad cars automobiles automobiles farm tractors
M4 medium tank	American Locomotive Baldwin Locomotive Detroit Tank Arsenal	locomotives locomotives tanks

¹⁷⁴ *Richmond Independent*, 10 May, 13 July 1945; "Richmond Tank Depot, Vol. IV, 1 April to 30 June 1945," 95, 139; "Richmond Tank Depot, Vol. V, 1 July to 30 September 1945," NARA, RG-156, Entry 646, box A601, pp 3, 16, 27.

¹⁷⁵ Campbell, *The Industry-Ordnance Team*, 219.

¹⁷⁶ "Statistical Work Sheets," Vol. 41, to 1 August 1945, unpublished report in NARA, RG-156, Entry 936, box L181.

	Fisher Tank	car bodies
	Ford Motor Company	automobiles
	Lima Locomotive	locomotives
	Pacific Car	railroad cars
	Pullman Standard	railroad cars
M2 half track	Autocar Co.	trucks
	White Motor Co.	trucks
M3 personnel carrier	Autocar Co.	trucks
	White Motor Co.	trucks
	Diamond T. Motor	trucks
	International Harvester	trucks & tractors

As the U.S. Army began increasing the output of tanks and other combat vehicles in 1940 and 1941, it recognized a bottleneck in the system. Manufacturers that had contracted to produce tanks would roll nearly finished vehicles off their assembly lines, but sometimes the tanks would sit on lots outside the factories for weeks awaiting accessories, like radios and small arms, or awaiting shipping orders. The delays were not the fault of the contractors but rather of Ordnance, which had the responsibility of supplying the accessories and making sure each tank was properly outfitted for its particular destination. Such delays sometimes slowed production, because contractors did not have sufficient storage space. The delays also depressed morale among factory workers, who were being asked to speed production to assist the nation's war preparedness only to see tanks sitting idly on the ground. The Ordnance Department therefore decided to establish tank depots, under the command of a new Intermediate Storage and Depot Unit, where nearly-finished tanks would await final outfitting. Ordnance started its first tank depot in January 1942 in leased shops of the New York Central Railroad at Toledo, Ohio, contracting with the Electric Auto-Lite Company to operate it. A few months later it contracted with the Ford Motor Company to establish tank depots at the branch plants at Chester and Richmond, the former primarily for processing vehicles to be shipped from the East Coast and the latter primarily for processing vehicles to be shipped from the West Coast. In December 1942, Ordnance moved its Ohio tank depot from Toledo to Lima, and the United Motors Service Division of General Motors took over the operation. Ordnance also had a depot at Longe Pointe in Montreal, Quebec, which processed American-made tanks prior to their shipment to Great Britain under the lend-lease program.¹⁷⁷

To appreciate the role of Richmond and the other tank depots, it is important to understand their position within the larger Ordnance scheme for managing the nation's production of tanks and other vehicles. The tank depots were part of the Tank Depot Section, which was one small unit within the Tank-Automotive Center, Detroit (later renamed Office of the Chief of Ordnance - Detroit), the creation of which has already been described. Within the organizational structure of the T-AC, major organizational components were each divided into

¹⁷⁷ "History - Tank Depot Section," unpublished report in NARA, RG-156, Entry 646, box A272, OCO-D file, Engineering-Manufacturing, Vol. I, Tank Depot Section, pp. 1-3, 6; "Industrial Service Tank Depot Operations (Final Issue), January 1942 thru December 1945," unpublished report in NARA, RG-156, Entry 962, box L303, pp. 1-18; Harry C. Thomson and Lida Mayo, *The Ordnance Department: Procurement and Supply* (Washington, DC: Government Printing Office, 1960), 254.

two tiers of staff units and operating units. Staff units had responsibility for various administrative functions, while operating units managed actual operating functions at that particular level in the hierarchy. Thus, T-AC, under the command of the Deputy Chief of Ordnance/Chief of Center, was divided into several branches. The staff branches were designated Executive, Control, and Legal, and there were several sections under them, such as the Policy, Organizational Planning, and Statistics sections under the Control Branch and the Publications, Security, and Fiscal sections under the Executive Branch. There were five operating branches: Development, Engineering, Manufacturing, Supply, and Maintenance. Each operating branch was in turn divided into two tiers of staff sections and operating sections. Planning and Control, Statistics, and Inspection were among the staff sections in the Manufacturing Branch. The Tank Depot Section was one of six operating sections in the Manufacturing Branch, the others being Tanks & Combat Vehicles, Transport Vehicles, Parts & Supplies, Tools & Equipment, and Miscellaneous Products.¹⁷⁸

As Ordnance was developing the system of tank depots, it recognized that it would have to coordinate closely with the Signal Corps, the branch of the army responsible for procuring, inspecting, and supplying fighting units with radios and other communications equipment. As an organization within the U.S. Army, the Signal Corps went back to just before the Civil War and the work of Albert J. Myer, who developed a code to be used with flags for transmitting information over distances beyond earshot. He continued to serve the army's communications needs during the Civil War and after. In 1880, the army officially created the Signal Corps, and Myer became its general. The Signal Corps was responsible for adapting new communications technologies to military purposes, including the telegraph, hot-air balloons, the telephone, and the wireless radio. In the two years prior to the establishment of the tank depots and America's entry into the war, the Signal Corps was just finishing its adaptation for military use of the FM radio equipment developed for police work by a man named Fred Link. With the help of Bell Laboratories and Western Electric, the Signal Corps was perfecting sets of short-range FM transmitters and receivers that allowed voice communications within and between tanks and other combat vehicles. The Signal Corps would be responsible for inspecting the installation of this equipment by workers at the tank depots. Other Signal Corps equipment installed in tanks by workers at the tank depots included flashlights and flag sets. Working through the Ordnance Department, the Signal Corps was also responsible for seeing that manufacturers produced tanks and other vehicles that were prepared to receive appropriate radio installations.¹⁷⁹

The San Francisco Ordnance District received instructions from the Office of the Chief of Ordnance in May 1942 to begin the preliminary work of establishing a tank depot in the Bay Area. By then, the Richmond branch had been assembling jeeps for several months. A short time later, an officer in Washington called the Ford Motor Company to inquire about the availability of the Richmond branch to prepare tanks for shipment overseas. Ford's Richmond

¹⁷⁸ "Organization of the Ordnance Department, 1940-1945," unpublished historical report in NARA RG-156, Entry 948, box L239, organization chart between pp. 54 & 55.

¹⁷⁹ "History - Tank Depot Section," 18-20; "Industrial Service Tank Depot Operations (Final Issue), January 1942 thru December 1945," 6-7; Dulany Terrett, *The Signal Corps: The Emergency* (Washington, DC: Government Printing Office, 1956), 3-21; George Raynor Thompson, Dixie R. Harris, Pauline M. Oakes, and Dulany Terrett, *The Signal Corps: The Test* (Washington, DC: Government Printing Office, 1957), 70-72. For a summary of continuing developments in tank communications equipment during the war, see George Raynor Thompson and Dixie R. Harris, *The Signal Corps: The Outcome* (Washington, DC: Government Printing Office, 1957), 118-122.

plant made an ideal facility because of ample outdoor space for storing vehicles and good access for shipping by both rail and sea. On 12 July, the San Francisco Ordnance District received official notification that the Richmond branch was to serve as a tank depot and that the Ordnance Department had chosen the military officers who would supervise the installation. The actual contract no. W-833-Ord-2676 between the War Department and the Ford Motor Company was dated 20 July 1942. It was a cost-plus-fixed-fee contract aimed at handling the equivalent of 250 tanks each month for a year. It stated that Ford would receive, store, prepare, complete, modify, and pack vehicles of many kinds, including light, medium, and heavy tanks, tank destroyers, heavy wrecking trucks, half-track vehicles and personnel carriers, and scout cars. The Richmond Tank Depot would also receive spare parts and accessories for those vehicles and prepare them for shipping. Destinations for vehicles, parts, and accessories would be both domestic and foreign. Under the contract, Ford would commit the entire craneway (40,000 square feet) plus 15,000 square feet of interior space adjacent to the craneway, 23,400 square feet on the pier, and 77,000 square feet of parking space.¹⁸⁰

When the tank-depot contract was signed, the Richmond branch was using the craneway to box jeeps for shipment abroad. That operation had to be moved outside immediately. Shortly thereafter, Ford built a boxing shed along the east side of the plant to facilitate the crating of jeeps and other vehicles. To make way for Ordnance Department staff, Ford created offices in the branch showroom. The assembly room was converted into an employment office (including waiting room and physical examination room), and an office for the Signal Corps. Ford remodeled the west end of the oil house for use as Ordnance's executive office. By August 8th, Ordnance had already assigned 400 vehicles to the Richmond Tank Depot. Shipping orders were in hand for 225 of them, and 121 had actually arrived. Processing the first vehicles progressed slowly, however, because Ford workers were still getting used to the new kinds of work, and there were shortages of parts and equipment such as radios and guns that were to be installed at Richmond. Ford employees worked eight-hour days and six-day weeks.¹⁸¹

As Ford's managers at Richmond were organizing themselves to supervise the work of a tank depot, the San Francisco Ordnance District had to organize its formal presence at the Richmond plant. During August, the depot's first month of operation, three military officers (one from the Signal Corps and two from Ordnance) and twenty-three civilian Ordnance employees organized an office. There was relatively little ordnance being shipped through Richmond yet, so the new personnel had a chance to get used to new procedures and help the Ford people do the same. To make security at the plant easier, Ordnance required that all of its employees wear identification of the Ford Motor Company's workers. The volume of ordnance arriving at the Richmond Tank Depot increased dramatically in September and continued to do so thereafter. Part of the increase was due to tanks being processed for the British. The first official representative of the British Army, Sgt. H.A. MacKenzie, joined the staff at the Richmond Tank

¹⁸⁰ "San Francisco Ordnance District History, 1939-1942," unpublished historical report in NARA RG-156, Entry 646, box A576, San Francisco Ordnance District, Vol I, Part 3, pp. 118-119; "Richmond Branch Operations under Contract W-883-ORD-2676," unpublished historical report in HFM Acc. No. 672, box 2, p. 1.

There is little evidence that many combat vehicles were shipped from the Richmond Tank Depot via ships that docked at the plant. One document, "Industrial Service Tank Depot Operations (Final Issue), January 1942 thru December 1945," unpublished report in NARA, RG-156, Entry 962, box L303, p. 16, had this to say in 1945: "The property is located on San Francisco Bay and has wharf and dock space available, permitting direct loading on ships. Advantage has been taken of this asset on all occasions in which circumstances permitted."

¹⁸¹ "Richmond Branch Operations under Contract W-883-ORD-2676," 1-3.

Depot in September, and a civilian representative arrived in November, both working in connection with the Lend-Lease Program. Some time later, they were joined by Maj. G. Alexeev, a liaison officer representing the Soviet Government Purchasing Commission. On 1 October 1942, jurisdiction for the jeep contract transferred from the Quartermaster Corps to the Ordnance Department. As a consequence, seven civilians from the Quartermaster Corps working at the Richmond branch transferred to Ordnance. The end of 1942 found the staff of the Ordnance Department struggling to keep up with the volume of work demanded of them at the Richmond Tank Depot.¹⁸²

Richmond was not the only Ordnance installation experiencing difficulties. With the rapid mobilization of production, manufacturers found many materials in short supply. There was a nationwide shortage of the steel alloy needed for tracks, so manufacturers appealed to the War Production Board for the necessary materials. Early in the tank depot program, therefore, tank manufacturers took advantage of the depots, shipping to them tanks that were still missing parts for which the contractors were responsible, such as tracks. Tanks at depots in November 1942 were missing an average of forty specified items. In January 1943, General Christmas issued an order forbidding factories from shipping tanks that were not fully equipped with items for which the producers were responsible. By March, inspections showed that tanks at depots were missing only three items on average.¹⁸³

These problems manifested themselves at the Richmond Tank Depot as well. From the outset, arriving tanks were missing important pieces of equipment that manufacturers should have provided. Late in September 1942, the Ordnance staff at the Richmond depot received an order from the Office of the Chief of Ordnance stating, "Ship no Vehicles from the Depot until on-vehicle materiel is complete for the vehicles on hand." The depot was not able to ship its first group of fully equipped tanks until 19 October 1942. Meanwhile, the Tank-Automotive Center, Detroit, authorized Richmond and the other tank depots to report incomplete tanks to the army Inspector of Ordnance at the respective plants from which the tanks had been shipped. Shortages on tanks decreased gradually through the fall until December, when Richmond received its first tank fully equipped by the manufacturer: Cadillac Division, General Motors Corporation, Southgate, California. Richmond also had difficulty procuring the equipment it was responsible for placing on the tanks prior to shipment. Again, the Tank-Automotive Center placed its own authority at Richmond's disposal in helping to secure the needed supplies. Nevertheless, tank shipments from the Richmond facility grew monthly through the end of the year.¹⁸⁴

The Richmond branch quickly became so adept at receiving, modifying, and shipping vehicles that by the end of 1942 it had already shipped 1,720 vehicles, or more than half its expected yearly total. Major Reed, the commanding officer of the Richmond Tank Depot, anticipated that the Ford workers would be able to ship more than 1,000 vehicles in each of the months of January and February 1943. To maintain such a delivery schedule, Ford agreed, at the

¹⁸² "San Francisco Ordnance District History, 1939-1942," Vol I, Part 4, p. 119-121; "History of the Richmond Tank Depot, Contract W-883-ORD-2676, Richmond, California (October 1943)," unpublished historical report in NARA RG-156, Entry 646, box A273, Office of the Chief of Ordnance - Detroit, Engineering-Manufacturing, Vol. IV, Part 1, October 1943, Tank Depot Section, p. 1-2.

¹⁸³ Thomson and Mayo, *The Ordnance Department: Procurement and Supply*, 255.

¹⁸⁴ "San Francisco Ordnance District History, 1939-1942," Vol I, Part 4, p. 121-123.

army's request, to increase the amount of space at the plant available to the tank-depot function. Moreover, once the workers had gained experience, they would be able to complete work on the tanks and other combat vehicles at about two-thirds the cost that had been estimated. In light of these accomplishments, Major Reed recommended the Ford Motor Company, Richmond branch, for an Army and Navy "E" Award in January 1943, just six months into the contract. The Richmond Tank Depot received the award in July 1943 (see section below entitled "Patriotism").¹⁸⁵

A year into its operation, the Richmond Tank Depot under the command of Maj. Dick R. Reed had an Ordnance Department staff of five military officers (including Reed) and some sixty Civil Service employees. Reed headed the Executive Office, which also included an executive assistant and two secretaries. Capt. M.L. Taylor was in charge of the Inspection Section, which also included Leo A. Young, chief inspector for Tank Depot operations, G.U. McFadden, chief inspector for the jeep production contract, two secretaries, and sixteen inspectors, four of whom were women. Lt. H.H. Josephs was the Property Officer. He headed a Property Section comprised of one assistant and fifteen clerical workers, fourteen of whom were women. Roscoe B. Smith, a civilian, headed the Fiscal Section, which had a time checker and two accountants, both women. Capt. G.W. Allyn represented the Field Service, and he was also the Executive Officer in Reed's absence. In addition, the Signal Corps had a contingent of one officer, Lt. Vincent J. Zumpano, and twelve civilians, four of whom were women. In October 1943, Zumpano was transferred to Philadelphia and replaced at the head of the Signal Corps staff by Lt. E.D. Carnes.¹⁸⁶

A year after it began operations, the Richmond Tank Depot was receiving and processing hundreds of vehicles each month. In July 1943, for example, Richmond received vehicles for processing in the following numbers:

M3A3	light tanks	862	
M5A1	light tanks	134	
M4 of several models	medium tanks		242
M16	multiple gun motor carriages	50	
M8	75-mm howitzer motor carriages	4	
M10	3" howitzer motor carriages	51	
M8	armored car	50	
M3A1	scout car	250	
M2, M3, M5	half-track	217	
misc.	trucks, tractors, and trailers	522	

The Richmond plant received those vehicles from Ordnance Depots and various manufacturers,

¹⁸⁵ "Richmond Branch Operations under Contract W-883-ORD-2676," 7; Dick R. Reed to Co. K.B. Harmon, letter dated 11 January 1943, appended to "Richmond Branch Operations under Contract W-883-ORD-2676." A table in NARA, RG-156, Entry 646, box A272, OCO-D file, Engineering-Manufacturing, Vol. I, Tank Depot Section, shows vehicle units received and shipped by the Richmond Tank Depot as of 28 December 1942. Total units shipped is 1,607, which differs from Captain Reed's figure of 1,720 vehicles, but that may be because Reed reported vehicles, and the table reported vehicle units.

¹⁸⁶ "History of the Richmond Tank Depot, Contract W-883-ORD-2676, Richmond, California (October 1943)," unpublished historical report in NARA RG-156, Entry 646, box A273, Office of the Chief of Ordnance - Detroit, Engineering-Manufacturing, Vol. IV, Part 1, October 1943, Tank Depot Section, p. 1-2.

including Cadillac, Chevrolet, Ford, Fisher Body, Pacific Car, Pullman, American Locomotive, Kenworth, White Truck, Diamond-T, International Harvester, Allis Chalmers, and John Deere.¹⁸⁷

Another tally showing the complexity of operations at the Richmond Tank Depot comes from a report for October 1943, when the facility received 2,528 vehicles and shipped 1,413. Of those shipped, 537 were crated for overseas delivery to U.S. forces, and 158 were shipped under the Lend-Lease program. At the end of the month, there were 3,280 vehicles on the grounds at the tank depot representing thirty-one different models, including five kinds of tanks as well as armored cars, several kinds of half-tracks, motor carriages for assorted large gun configurations (howitzers, multiple gun arrays, etc.), and numerous tractors, light, medium, and heavy trucks, cranes and wrecker trucks, and landing vehicles. That month, the Richmond Tank Depot also embarked on a new program of repairing and overhauling tanks and half-tracks that had been damaged during practice exercises at various army training bases in the western U.S. At the beginning of October, Ford had 672 men and 248 women working on the tank-depot contract. By the end of the month, the number of men increased to 753, but the number of women dropped to 227. Ford also made some physical changes at the facility to better accommodate rainy weather during the winter months. Construction crews built a loading dock along the east side of the plant and a shed-roof over the #2 track. Beginning October 12, crews at the depot also moved all stored vehicles to a lot across Hall Avenue so that fill could be added to the storage lot at the Ford branch and the surface graded to allow improved drainage. During the previous rainy season much of the operation around the Richmond Tank Depot had been mired in mud.¹⁸⁸

The volume of vehicles that moved through Richmond in October mirrored activity at the Chester and Lima tank depots as well. That month, the three depots shipped a total of 13,562 vehicles and processed even more. This was because the nation's and the tank depots' capacity of production exceeded the capacity of the nation's ships and ports of embarkation to ferry the ordnance to overseas theatres. The total number of vehicles in inventory at the three tank depots was 10,282 on October 1st. At the end of the month, they collectively held 14,105 vehicles. With so many vehicles in reserve, the Ordnance Department had the depots maintain a more level rate of production and eliminate much of the overtime that had been logged during previous months trying to rush crucial orders to the front.¹⁸⁹

At the end of the war, the Tank Depot Branch of the Engineering & Manufacturing Division, OCO-D, compared the nature and number of vehicles processed and shipped by Richmond with those shipped by the other tank depots as follows:

This Depot has handled primarily West Coast export and domestic shipments and

¹⁸⁷ "Office of the Chief of Ordnance - Detroit, Engineering - Manufacturing, Vol. III, July-September 1943," unpublished historical report in NARA RG-156, Entry 646, box A273, tables for Richmond Tank Depot at the end of Chapter VIII, Tank Depot Section.

¹⁸⁸ "History of the Richmond Tank Depot, Contract W-883-ORD-2676," 3-5; see also photos appended to the report showing vehicles in the mud. Photographs of the overhauled M2 half-tracks are presented in a subsequent report, "Richmond Tank Depot," Vol. II, part 2, December 1944, NARA, RG-156, Entry 646, Post-WWI Division Services and Other Units, Executive Division Historical Branch, Histories of Ordnance Installations & Activities, 1940-1945, San Francisco Ordnance District, box A600.

¹⁸⁹ "Office of the Chief of Ordnance - Detroit, Engineering - Manufacturing, Vol IV, Part 1, October 1943," unpublished historical report in NARA RG-156, Entry 646, box A273, p. 37.

the volume of vehicles handled to date has not been as great as for the Chester and Lima Tank Depots. It is also to be noted that, whereas Chester and Lima Tank Depots handle similar type vehicles, the Richmond Tank Depot has handled models and types dis-similar in some respects from other Depots. For instance, this Depot has handled very few vehicles for lend-lease agencies but has handled almost 100 per cent of Marine Corps requirements for Ordnance vehicles.¹⁹⁰

As mentioned above, the Richmond Tank Depot processed and shipped 55,904 vehicle units during the war. Chester and Lima processed and shipped 152,300 vehicle units and 91,079 vehicle units, respectively.¹⁹¹ Richmond supplied nearly all of the combat vehicles for the Marine Corps because the Marines were largely responsible for the amphibious landings used in capturing islands from the Japanese during the war in the Pacific.

The Richmond Tank Depot had a steady stream of vehicles to process throughout the war years, but occasionally the War Department made special requests of the workers at the plant. One such instance occurred in spring 1944. Early on the afternoon of Saturday, March 18, Maj. W. Delbert Ball, the new commanding officer who had arrived at the Richmond Tank Depot in January, received a message from the Office of the Chief of Ordnance - Detroit stating that the U.S. Army had an urgent need for sixty carloads totaling 120 landing vehicles, and those vehicles had to depart Richmond within forty-eight hours by special train to New York. (Could it be that these landing vehicles would be sent from New York to England in preparation for the D-Day invasion?) The entire workforce, Ordnance and Ford employees alike, worked long hours through the weekend and met the forty-eight hour deadline. Some workers endured a sixteen hour workday, went home for only four hours rest, and then returned to help finish the job. The Richmond Tank Depot had already received Army-Navy "E" Awards for excellence in production for the war effort over long periods (see section below entitled "Patriotism"). For their efforts on that weekend, workers at Richmond received an immediate telegram from the Office of the Chief of Ordnance stating, "Richmond's performance in recent urgent shipment most outstanding accomplishment and great contribution to war effort."¹⁹²

The Ford management and production workers at the Richmond branch were judicious in the expenditure of energy, and they were not willing to exhaust themselves needlessly. That attitude was demonstrated that same spring when the Richmond Tank Depot received word that the U.S. Army needed hundreds of 2-1/2 ton 6 x 6 trucks to be cut in half and then bolted back together prior to shipment overseas. The purpose of the exercise was to prepare the trucks so that they could be shipped to an air field, unbolted, loaded into transport planes, flown to the battlefield, and then bolted back together for use in supplying troops. Each truck modified

¹⁹⁰ "Industrial Service Tank Depot Operations (Final Issue), January 1942 thru December 1945," 17.

¹⁹¹ "Industrial Service Tank Depot Operations (Final Issue), January 1942 thru December 1945," tables p. 2.

¹⁹² Delbert Ball to All Personnel - Richmond Tank Depot, memorandum dated 21 March 1944, copy appended to "Richmond Branch Operations under Contract W-883-ORD-2676," 7; "Richmond Tank Depot, Vol. I, 1 January to 30 September 1944," unpublished historical report in NARA RG-156, Entry 646, box A599, p. 8.

An article in the April 1943 of *American Magazine*, "American Workers Licked Rommel!" by Don Eddy, tells another dramatic story of the tremendous effort workers at the Chester Tank Depot made to process tanks and prepare them for shipment to North Africa in time for the British Army to defeat Field Marshal Rommel's tank corps. A typescript of the article is appended to one of the copies of "History - Tank Depot Unit."

would be worth 1.7 contractual units. OCO-D told Richmond it would send modification kits for the job, setting a deadline of April 15. Trucks began arriving the first week in April, and crews began modifying a few trucks each day in the absence of kits or instructions. OCO-D pressured Richmond to get the rate up to 100 trucks per day. By authorizing overtime and instituting other emergency measures, the Tank Depot got its rate up to fifty trucks per day by April 20. Even as OCO-D was urging greater output, Major Ball contacted the ports and found that there were no shipping orders for the trucks he was readying. Despite the pressure from above, he therefore maintained output at fifty trucks per day, continuing to authorize overtime to meet that rate. The Richmond Tank Depot completed the order on May 10, but then the crated trucks sat on the lot for more than a month, occupying valuable storage and work space. After the episode, Ball reported to his superiors that the experience had demoralized both the management and the union at the Richmond plant.¹⁹³

By the spring of 1943, the U.S. government had spent \$250,000,000 paying contractors to build and equip sixteen factories for producing tanks at an aggregate capacity of 7,705 vehicles per month. The companies were producing tanks at a rate of about 4,000 per month, and output was starting to meet the demand. Recognizing that it had built surplus capacity for the production of tanks, Ordnance began to discontinue some of the sixteen contracts for tanks. Four were terminated in October 1943 and four more the following year. That brought the capacity to make tanks down to about 4,000 per month, but by then output had dropped to about 2,000 per month. These changes yielded some improvements in the overall system, however, as labor and machine-tool shortages in the tank industry were largely alleviated. Shortages of tanks on the battlefield continued, though, because commanders wanted ever more of the newer units. In 1944 and early 1945, Ordnance again tried to increase production, but shortages in tools, capacity, and labor precluded the output meeting demand. As an alternative to building new tanks, Ordnance embarked on a program of remanufacturing tanks and other combat vehicles. This involved reconditioning units that had been used for training troops in the U.S. before they were shipped overseas. These vehicles, which tended to be older, were sent to manufacturers to have their engines overhauled, worn tracks replaced, and guns reconditioned. Then, after a new coat of paint, the remanufactured combat vehicles were ready to battle, at about half the cost of building a comparable new vehicle.¹⁹⁴

The Richmond Tank Depot was also involved in some of the remanufacture programs, beginning in 1943. In subsequent years, Richmond continued to participate in the program. In 1944, for example, Ordnance had 300 light tanks stored at Yermo, California, that had originally been consigned to the Chinese government. The British had a greater need for the tanks and convinced Ordnance to repossess them, requesting that the Richmond Tank Depot modify them to meet British specifications. Richmond began shipping the modified tanks by rail to the New York Port of Embarkation in July.¹⁹⁵

Richmond's record of performance reflected the national manufacturing trend, although

¹⁹³ "Richmond Tank Depot, Vol. I, 1 January to 30 September 1944," 6-8; "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," RG-156, Entry 646, box A599, p. 2.

¹⁹⁴ Thomson and Mayo, *The Ordnance Department: Procurement and Supply*, 255-259.

¹⁹⁵ "Richmond Tank Depot, Vol. I, 1 January to 30 September 1944," NARA, RG-156, Entry 646, box A599, 8-9.

Richmond's peak of production came, not surprisingly, some months later than tank manufacturers' peak of production since Richmond was processing vehicles already shipped from factories elsewhere. Richmond's peak month for vehicles shipped was May 1944 when the depot shipped more than 2,800 tanks and trucks. Richmond's peak month for contractual units shipped was June 1944 when the depot shipped more than 2,400 units (that being the month when the depot modified a large number of the 2-1/2-ton trucks worth 1.7 units each). During the second half of 1943 and the first half of 1944, Richmond's production had been fairly steady at about 1,600 vehicles worth about 1,200 units. After the peaks in 1944, production at Richmond dropped to less than 1,000 contractual units per month for August through December. Responding to the drop in demand, Ford laid-off about 500 workers in October, roughly one-third of the total work force. Then in 1945, production picked-up again, rising to a second peak of nearly 2,000 units in March. Production remained above 1,000 units for the duration of the war.¹⁹⁶

In August 1944, the U.S. Army had seven officers and sixty-nine civilians working at the Richmond Tank Depot. The following table shows the employment levels Ford had at the depot that month:

**Employment at the Richmond Tank Depot
August 1944**

Executive and Administrative personnel				15
Office and Clerical Employees				124
Engineering				3
Custodial				94
Guards				85
Shop Foremen				109
Inspectors				41
Production Workers:	male	female		
1st shift (10:30 pm - 6:30 am)	189	73		262
2nd shift (6:30 am - 2:30 pm)	647	172		819
3rd shift (2:30 pm - 10:30 pm)	344	124		468

In addition, the Ford Motor Company had 412 men and 114 women working during the second shift either in the stock parts department or on the payrolls of sub-contractors in jeep production, which made a total of 2075 production workers in the Richmond Tank Depot.¹⁹⁷

During the peak production in 1944, so many vehicles had arrived that the Richmond Tank Depot filled the parking space available on the Ford property and secured a nearby island from the Maritime Commission, where LTVs (landing vehicle tracked) could be parked. The vehicles had to be driven through about 400 yards of water to get to the island for parking. In October, Ordnance leased land at Lathrop, in the San Joaquin Valley south of Stockton, and

¹⁹⁶ "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 2, 10, 17; "Richmond Tank Depot, Vol. V, 1 July to 3 September 1945," RG-156, Entry 646, box A601, pp. 101-102.

¹⁹⁷ "Richmond Tank Depot, Vol. I, 1 January to 30 September 1944," 26-27.

moved the vehicles there, because the rainy season was coming and the island, built of silt, was expected to become too muddy to be serviceable. By the end of the war, Ordnance had leased four separate parcels of land near the Ford property, including ground owned by the Parr-Richmond Terminal Corporation and Filice & Perrelli Canning Company, to store vehicles for which there was insufficient space on the Ford lot.¹⁹⁸ Some vehicles sat on the various lots so long that in December, Ordnance directed Ford to establish a program for inspecting vehicles' fuel systems to determine whether they needed to be degummed. Enough vehicles were in need of such remedial action that Ordnance authorized Ford inspect and degum pilot models of fourteen distinct vehicles so that the contract could be modified to specify a price for inspecting and removing gum from each kind of vehicle. Ordnance also began shipping vehicles from other depots to Richmond for degumming.¹⁹⁹

The fluctuations in production were frustrating for the Ford Motor Company and the Ordnance commanding officer. Both parties were trying to keep the unit cost as low as possible, which meant that employment levels had to match demand. Yet it was hard for both the managers at Richmond and OCO-D in general to predict demand because situations on the various fronts of the war were nearly impossible to predict. If Ford maintained an employment level that was higher than needed to meet demand, then unit costs rose. If Ford released employees because predicted demand was down, and then the depot received a sudden emergency order for production, the remaining employees would have to work overtime, thus raising the unit costs.²⁰⁰

Because the nation was at war, security at the Richmond Plant Depot was a high priority. According to Major Ball, however, this entailed little change from the Ford Motor Company's practices during peacetime. Ford had a department at the Richmond branch called Plant Protection, and the guards who worked for that department changed their practices little on account of the war-production contracts. In addition to securing the property and building, the employees of Plant Protection enforced all of the company's rules and procedures on the premises. This included monitoring time cards and accounting for all materials received and shipped. Plant Protection's duties also extended to enforcing rules like the ban on smoking everywhere on the 43-acre property except the cafeteria. According to Ball, military inspectors who visited the Richmond Tank Depot routinely reported favorably on the Ford's security organization.²⁰¹

Because of the high degree of security imposed on the Richmond Tank Depot's operations, the military shielded the plant from public view, including from newspaper reporters. The Ordnance Department finally opened the plant to reporters in early July 1943, when Colonel Harmon of the San Francisco Ordnance District and Captain Reed, commanding officer of the tank depot, hosted a tour by journalists and photographers representing Bay Area news organizations. Nearly every Bay Area paper featured a prominent article describing the lifting of

¹⁹⁸ "Richmond Tank Depot, Vol. I, 1 January to 30 September 1944," 9; "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 112-113; "Richmond Tank Depot, Vol. V, 1 July to 30 September 1945," 85.

¹⁹⁹ "Richmond Tank Depot, Vol. III, 1 January to 31 March 1945," NARA, RG-156, Entry 646, box A600, 2-3.

²⁰⁰ "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 2-3, 18.

²⁰¹ "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 8-9.

secrecy at the plant, the kinds of tanks and other combat vehicles being processed, the assembly of jeeps, the large numbers of women working there, and the tasks involved in preparing vehicles for shipment overseas.²⁰² A story run in *The Labor Herald* (the newspaper of the Congress of Industrial Organizations, or CIO, for northern California) provides an interesting insight into the extent of secrecy prior to the July 8 tour. Just as Ordnance was hosting the tour, *The Labor Herald* ran an article about Soviet soldiers fighting the Nazis near Odessa. One of the Soviet soldiers' battle cries was, "Remember Workers in California," because the soldiers knew their tanks came from a city in California, but *The Labor Herald* could not reveal the name of the city. The paper could only write that CIO members worked on tanks there. Following the tour, however, *The Labor Herald* was able to publish a follow-up story revealing that those Soviet tanks came from the Richmond Tank Depot.²⁰³

W.A. Abbott was Ford's plant superintendent during the entire war. Maj. W. Delbert Ball was the commanding officer through October 1944. The following month, Capt. George A. Spiker took charge as commanding officer when Ball was transferred to San Francisco to take charge of Ordnance District's Tank-Automotive Branch.²⁰⁴

During the course of the tank-depot contract, Ford sub-contracted some of the work to other companies. W.A. Bechtel in Oakland, as well as Moore Equipment Company, Allison Steel Manufacturing Company, and Stewart & Stevenson, sub-contracted to recondition some GPW units. These were jeeps that had been remanufactured by others, sent to the Richmond Tank Depot for processing and boxing, and then rejected during inspection because of mechanical deficiencies. The sub-contractors were to repair the deficiencies. This was apparently a troublesome process, because numerous vehicles returned to the Richmond Tank Depot were still deficient after inspection. K&D Industries of Sacramento and Harris Manufacturing of Stockton had sub-contracts worth \$83,236.24 and \$31,040.48, respectively, to prepare vehicles to be stored at Lathrop Holding and Reconsignment Point, one of the extra plots of land leased to store excess vehicles.²⁰⁵

As the processing of combat vehicles began to decrease in the spring of 1945, operations at the Richmond Tank Depot were seriously interrupted on May 2, when the partially outfitted SS DREXEL VICTORY side-swiped the waterfront loading dock of the Ford plant as the ship was being tugged from Kaiser's Richmond shipyard no. 2, severely damaging the gantry crane that served the Ford dock. The collapsing gantry crane damaged the brick wall of the plant, which in

²⁰² "Ford Plant Here Main Coast Tank Depot," *Richmond Independent*, 8 July 1943, 1; "Richmond Ford Plant Now Is Huge Army Tank Arsenal," *The San Francisco News*, 8 July 1943, 2; "Women on Assembly Line Turn Out More Daily Than Pershing Had in 1918," *The Call Bulletin* (San Francisco), 8 July 1943, 11; "Ford Plant Lifts Veil of Secrecy," *Oakland Tribune*, 8 July 1943, 1; "Flivver' Plant Becomes Huge Army Depot," *San Francisco Examiner*, 9 July 1943, 9; "Army Lifts Veil and Shows How Bay Tank Depot Works," *San Francisco Chronicle*, 9 July 1943, 5.

²⁰³ "Tanks from U.S.A.," *The Labor Herald*, 9 July 1943, 2; "Richmond Auto Workers Made Russ Hero's Tank," *The Labor Herald*, 23 July 1943, 7.

²⁰⁴ "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 21, 45.

²⁰⁵ "Richmond Branch Operations under Contract W-883-ORD-2676," 5; "Richmond Tank Depot, Vol. III, 1 January to 31 March 1945," 72-73, 185-187; "Richmond Tank Depot, Vol. V, 1 July to 30 September 1945," 86-87, 145.

turn damaged one of the interior overhead cranes in the craneway. The accident also damaged five military vehicles that had been stacked nearby.²⁰⁶

Another accident had occurred the previous month that reflected a different sort of laxity as the war drew to a close. On April 14, two Ford workers took an amphibian jeep for an unauthorized cruise in the bay while a group of the vehicles was being prepared for shipment. Ordnance and Ford managers had received instructions not to test the amphibians because they were not yet ready for travel in water, but the workers evidently had not heard or heeded the instructions. The amphibian jeep sank about 100' from shore in 30' of water. One worker swam to shore, but the other had to be rescued by some nearby Signal Corpsmen. The depot had to hire a barge and diver to locate and retrieve the jeep.²⁰⁷

Immediately after V-J Day, the government terminated most contracts for the production of ordnance and other items needed for the war effort. Ford's contract to operate the Richmond Tank Depot was not, however, one of those immediately ended, although within a few days the steady stream of vehicles arriving at the depot for processing ceased. Some vehicles already en route to Richmond did arrive in the days immediately following V-J Day. In September, only 240 vehicles, representing odds and ends from vehicle manufacturers around the country, arrived at Richmond. The last vehicles received by the Richmond Tank Depot were two heavy tanks, which arrived during the first week of October. Meanwhile, more than 4,000 vehicles on the lots in Richmond still had to be processed to make them usable by the U.S. Army. One of the main changes in processing after V-J Day was that workers no longer prepared vehicles for shipment overseas, although some of the vehicles already under order for shipment abroad were still shipped after Japan surrendered. After mid-August, most vehicles were prepared for long-term storage at domestic army depots in Utah and elsewhere in California.²⁰⁸

During the first week in September, the Richmond Tank Depot was shipping about thirty vehicles per day. On September 10, Ford transferred 200 workers to Ordnance work and increased the rate to about seventy-five vehicles daily. Ford put workers on a forty-eight hour week on September 15 to increase output further. On 28 September 1945, the Richmond Tank Depot finally received notice that Ford's contract would terminate on October 31. The depot also received the last of many change orders, no. 95, stating that Ford was to provide all labor and materials necessary for dismantling and preparing for shipment all government-owned equipment and other property. The termination notice included an exception for change order no. 95, recognizing that dismantling the government's operation would not be complete by the end of October.²⁰⁹

At the beginning of September, there were still more than 1,000 vehicles being stored at

²⁰⁶ *Richmond Independent*, 3 May 1945; "Richmond Tank Depot, Vol. IV, 1 April to 30 June 1945," 99-100, 153-158.

²⁰⁷ "Richmond Tank Depot, Vol. IV, 1 April to 30 June 1945," 21-23; "Richmond Tank Depot, Vol. V, 1 July to 30 September 1945," 7.

²⁰⁸ *Richmond Independent* (16 August 1945): 1, 15 and (22 August 1945): 1-2; "Richmond Tank Depot, Vol. V, 1 July to 30 September 1945," 88-92, 132-133, 157.

²⁰⁹ "Richmond Tank Depot, Vol. V, 1 July to 30 September 1945," 141, 155-156.

the Lathrop facility, and Harris Manufacturing was still engaged in its sub-contract for "preservative maintenance" of the vehicles. Shortly thereafter, the Richmond Tank Depot received orders to ship all those vehicles directly to the Tooele Ordnance Depot in Utah, bypassing Richmond. Ordnance therefore terminated its contract with Harris Manufacturing and took bids from three companies, including Harris, to simply prepare the vehicles for shipment to Tooele. K&D Industries of Sacramento was the low bidder and received the contract, work to be completed by October 24 (later amended to November 13). In the end about 250 of the vehicles stored at Lathrop were sent to Richmond before being shipped to their final destinations.²¹⁰ By the end of September, the Richmond Tank Depot had shipped enough vehicles that it was able to vacate all the nearby leased lots except the one being leased from the Parr-Richmond Terminal. Ordnance vacated that last leased lot by the end of October.²¹¹

The Richmond Tank Depot met its deadline, shipping the last of its vehicles on October 31. Some of the vehicles stored at Lathrop were not shipped, however, until mid-November. By the end of October, the force of Ordnance employees had dropped to forty. Most of them received notices that their employment would end November 17, with a few remaining to complete the paperwork of terminating the contract with Ford. One Ordnance employee, Mary Ambrosio, resigned her Ordnance position in the Property Branch to go to work for Ford.²¹²

F. Patriotism

During World War II, there were many ways individuals and groups could demonstrate their patriotic commitment to their nation's war efforts. The most direct participation, of course, was through military service, especially on the front lines with the U.S. Army, Navy, Marines, and Army Air Force. Others, such as the men and women who worked at the Richmond Tank Depot, set aside their normal pursuits to work long hours producing the materiel needed by the military to prevail over the Axis powers in the war. Citizens who did not undertake either of those direct kinds of participation in the war effort, nevertheless had other means to contribute to the cause. One was through the purchase of War Bonds, a program devised by the U.S. Army. To instill in citizens the sense of a tangible contribution to the war, groups who bought the bonds could designate them towards the cost of specific vehicles. In November 1944, the Richmond Tank Depot received a shipment of plaques from OCO-D, engraved with the names of organizations presenting vehicles to the Army by purchasing War Bonds. For example, the students of Garfield Heights High School in Ohio purchased enough bonds to present the U.S. Army with a light tank; the Ladies Auxiliary of Lodge No. 9, Brotherhood Protective Order of the Elks, St. Louis, presented a heavy tank; the Commercial Telephone Employees of Alexandria, Virginia, presented a half-track personnel carrier; the Abraham and Chaia Rosenblum Foundation presented a scout car; the Class of 1944 at Overbrook High School in Philadelphia presented two scout cars and a half-track personnel carrier; and other organizations

²¹⁰ "Richmond Tank Depot, Vol. V, 1 July to 30 September 1945," 144-148; "Richmond Tank Depot, Vol. VI, October 1945," 1, 6.

²¹¹ "Richmond Tank Depot, Vol. V, 1 July to 30 September 1945," 152; "Richmond Tank Depot, Vol. VI, October 1945," 7.

²¹² "Richmond Tank Depot, Vol. VI, October 1945," 1-2.

made similar presentations.²¹³

The practice continued into 1945, although simple decals replaced the plaques as the means of naming the organization that was presenting a particular vehicle to the U.S. Army. In March 1945, the Northern California War Finance Committee sent the Richmond Tank Depot 143 decals, each decal naming a school or other organization, representing the like number of vehicles school children purchased for the army through War Bonds. Most of the schools were in California, but other western states were represented as well. Eleven Richmond schools purchased a total of fifteen vehicles, and some of the Richmond students and teachers were able to tour the depot and watch workers affix the decals to their vehicles.²¹⁴

Workers at ordnance facilities throughout the nation worked long days and weeks at often tedious jobs supplying soldiers, sailors, and airmen with the weapons, ammunition, and equipment they needed to wage war against the Axis powers. Companies operating the plants had huge orders to meet while facing chronic shortages of labor and materials. Absenteeism and labor turnover were high in many industries. Nevertheless, many of the workers were driven by a tremendous sense of patriotism, that they were doing their bit to help win the war. Many workers also sought to help foster a feeling of patriotism in the workplace through formally and informally instituted practices.

One practice entailed the circulation of stories portraying the mutual goodwill exhibited by Americans on the homefront as they worked together with the military to win the war. Two stories broadcast by the Lima Tank Depot are illustrative. During August 1943, there was a tremendous volume of tanks and other vehicles being prepared for shipment overseas, and the bottleneck in the system was in the crating department, where each vehicle was placed in its own wooden box. There were not enough workers to maintain the pace of crating that was required for the depot to meet its shipping deadline. Near week's end, the top Ordnance officer posted signs around the plant stating, "Nailers Wanted. 16 to 60 Years. Please Help." Workers at the plant carried the message home, and over the weekend some 700 townsfolk, representing professions from farmers and butchers to doctors and lawyers, came to the plant to lend a hand. Thanks to the weekend "Commandos," the Lima Tank Depot met its August deadlines.²¹⁵

In another Lima story, a worker had lost his wallet one day while processing a medium tank. After looking everywhere he could, he had concluded he would never find it again. Sometime later, though, he received the wallet in the mail, accompanied by a note from the soldier in North Africa who had found it. The wallet still held all of the Lima worker's money and identification papers, and the note thanked the worker for the job he was doing and begged that he keep it up.²¹⁶

To reward firms that excelled in production for the war effort and to publicize those good

²¹³ "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 47, 70.

²¹⁴ "Richmond Tank Depot, Vol. III, 1 January to 31 March 1945," 178-179, 202-204.

²¹⁵ "Office of the Chief of Ordnance - Detroit, Engineering - Manufacturing, Vol. III, July-September 1943," unpublished historical report in NARA RG-156, Entry 646, box A273, p. 26.

²¹⁶ "Office of the Chief of Ordnance - Detroit, Engineering - Manufacturing, Vol. III, July-September 1943," 26.

efforts in furtherance of national purpose, the military awarded firms the "E" Award. The Richmond branch received four such awards, the first on 31 July 1943. The ceremony at which the Richmond branch actually received the award took place on 24 August outside the plant. Richmond civic leader Fred Parr served as master of ceremonies, introducing Col. K.B. Harmon, chief of the San Francisco Ordnance District; Navy Capt. (ret.) Harvey Delano, War Plans Officer for the Twelfth Naval District; J.R. Davis, the Ford Motor Company's Western regional manager; and W.A. Abbott, superintendent of the Richmond branch. The award included a special flag that the Richmond branch could hoist on its flagpole below the flag of the United States. Employees also received special "E" pins. Following the ceremony, employees and their families and friends were able to walk along the roadway west of the plant, which was lined with dozens of examples of the vehicles the Richmond Tank Depot was processing. This was one of the first times people who did not work at the Richmond branch had been able to see what was happening there and the kinds of vehicles the army was sending overseas to support the troops. The other "E" awards followed on 29 January and 14 October 1944 and 5 May 1945. Rather than new flags, the subsequent awards each entailed a new star that the Richmond branch could add to its "E" Award pennant.²¹⁷

In January 1946, Gen. L.H. Campbell, Chief of Ordnance, sent Col. K.B. Harmon, Chief of the San Francisco Ordnance District, a letter requesting a list of "outstanding" prime contractors in the San Francisco District, contractors that excelled in meeting the following criteria:²¹⁸

- a. getting into production in an unusually short time
- b. distinction in quality of their production
- c. unusual contribution to development, testing, or engineering
- d. unusual reduction in cost
- e. outstanding performance on spare parts deliveries
- f. outstanding performance in handling engineering changes
- g. special distinction in cooperating with Ordnance
- h. high performance in meeting schedules
- i. special managerial skill in using sub-contractors and avoiding excessive new facilities

Harmon responded with a list of forty-seven contractors whose record he and his staff considered outstanding. Of those, he highlighted twenty-one as being especially outstanding. The Ford Motor Company was one of the especially outstanding prime contractors for its operation of the Richmond Tank Depot. Other Richmond firms on the list were: the Chemurgic Corporation, which developed pyrotechnic materials; American Radiator and Standard Sanitary Company, which produced hand grenades; and Rheem Manufacturing Company, the Richmond plant of which made M13 cartridge storage cases. Companies in the San Francisco Ordnance District receiving Army-Navy "E" Awards, in addition to Ford's Richmond plant, were: Columbia Electric & Manufacturing Company of Spokane, which made artillery shells; Yuba

²¹⁷ "Richmond Branch Operations under Contract W-883-ORD-2676" (HFM), 7; "Richmond (Cal.) Branch Receives Army-Navy 'E'," *Ford Times*, 17 September 1943, 5; *Richmond Independent*, 2, 23, 24, & 25 August 1943, 15 June 1945; "Richmond Tank Depot, Vol. IV, 1 April to 30 June 1945," 102, 227-229.

²¹⁸ Gen Campbell to Col. Harmon, letter received 5 January 1946, NARA, RG-156, Entry 654J, box 21, publications & reports, 1941-1945.

Manufacturing Company of San Francisco, which produced 155mm howitzers (five of its sub-contractors in the Bay Area also received the Army-Navy "E" Award); and Fanger Research & Development Company of San Francisco, which developed a new manufacturing method for a split ring used on Yuba Manufacturing's 155 howitzer. Ford's Richmond plant was apparently the only one to receive multiple "E" Awards, perhaps because the facility never missed a production deadline, as cited by Harmon.²¹⁹

One thing private firms like Ford were not allowed to do during the early part of the war was advertise the contributions they were making to war production. The War Department prohibited announcements of any contracts received for production of ordnance. Richmond and the other Ford branches received instructions from Dearborn that the Ford News Bureau would make any such announcements on behalf of the company, but only when significant percentages of contracts had been delivered to the U.S. Army and then only after any announcement had been cleared with the War Department. It was in this context of secrecy during the early part of the war that the Richmond Tank Depot had been closed to the eyes of the public until reporters were allowed to view operations in July 1943 (described above), shortly before the August 1943 "E" Award ceremony.²²⁰

Workers at the Richmond branch did more to support the troops in the field than simply do excellent work in preparing tanks and other combat vehicles for shipment abroad. They also undertook a special project aimed at bolstering the morale of soldiers on the front lines, far from home. Under the leadership of Frank Vivian, an engineer in the boiler room, members of UAW Local 560 (who called themselves the "boilerhouse gang") collected current magazines and newspapers from members of the community, wrapped them in packages, and placed a package in each completed jeep or tank before it was sealed for shipment. By November 1944, workers at the Richmond Tank Depot had sent 40 tons of magazines, bundled and stowed in vehicles, to the troops in the theatres of war. The Ford Motor Company allowed its employees to conduct the project on company time and provided work space for the packages to be assembled. Vivian also used his own wages to purchase small American flags so that a flag would adorn each vehicle that left the Richmond Tank Depot. He estimated that by September 1944 he had purchased 18,000 flags.²²¹ The bundles of periodicals each carried a copy of a letter, of which the following are a few of the lines being sent in September 1944:

For over two years, we old engineers at the Ford Motor Company
Powerhouse at Richmond, California, Ford Plant, which is now known as the
Richmond Tank & Motor Vehicle Depot, have been placing bundles of

²¹⁹ "List of Ordnance Contractors," list attached to Colonel Harmon to General Campbell, letter dated 5 January 1945, NARA, RG-156, Entry 654J, box 21, publications & reports, 1941-1945.

²²⁰ Superintendent's Office to J.R. Davis and W.A. Abbott, memorandum dated 18 September 1942, HFM Acc. No. 371, box 16, folder 4.

²²¹ "GI Bundles - Richmond Tank Builders Keep South Pacific Servicemen Happy," *The Labor Herald* (San Francisco), 22 September 1944, 2; "Richmond Branch Employee Places Flags on Tanks at Coast Depot," *Ford Times*, 28 May 1943, 6; "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 59-60, 89. A photograph in HFM Acc. no. 89, box 1, Richmond Branch WWII Photos folder, show one of the bundles of periodicals as it was found in the engine compartment of a jeep sent to the Studebaker Proving Ground. An accompanying photograph shows the periodicals, displayed on a table. They included: *Life*, *Collier's*, *Hollywood*, *Movieland*, *Screen Romances*, *Photoplay*, *San Francisco Examiner*, and *Oakland Tribune*.

periodicals and magazines in export jeep crates, tanks, and other battle-wagons--where there is spare space to stow them.

The 'honeys' who now work in the plant bring them into the powerhouse and we engineers in our spare time bundle them up--for you!

The boys and the gals--at the Ford Richmond Tank Depot--will relax no effort until this job is done--we promise you.²²²

Vivian tried to think of other ways to boost morale for soldiers fighting overseas and convey to them the patriotic spirit of the ordnance workers on homefront. Whenever he saw that the Richmond Tank Depot was processing a group of tanks or other vehicles under a "deadline" order, he suspected that the tanks were bound for a beach landing. He would find a location in one of the vehicles to place an American flag of standard size, accompanied by a note saying, "HI 'BUDDIE,' PUT THIS GRAND OLD FLAG UP ON THE HIGHEST PEAK, MOUNTAIN OR HILL ON WHATEVER ATOLL IT HAPPENS TO LAND ON. GOOD LUCK AND GOD-BLESS YOU'ALL, Signed- VIV." He claimed to have received a letter from Iwo Jima, accompanied by prints of Jack Rosenthal's famous photograph for the Associated Press, stating that the flag planted by Marines atop Mount Suribachi was one of the flags Vivian had placed in a piece of ordnance equipment at the Richmond Tank Depot.²²³

Vivian also tried to boost the morale of his fellow workers in Richmond by writing notes to accompany the bundles of periodicals and asking the soldiers and service-women who found the notes to write back. Then he would distribute the letters he received. Here is a sample recorded in one of Capt. Spiker's monthly histories:

One of the bundles of magazines which you sent overseas is being put to good use in our club here in Australia. Men on leave from New Guinea, and nurses too, are reading the magazines....Keep up the good work. *Margaret Griffin, American Red Cross*

Magazines received. A thousand thanks from happy Yanks. *Cpl. I. Horning from the Pacific*

These bundles were distributed by us to the Red Cross installation and Army and Navy hospitals in this area. The boys are so hungry for home town news and American magazines of any kind, that our office has been flooded by servicemen, both Army and Navy and even men from the American Transport Service, who have found that they are here and have tried to borrow them. As far as they go, we have filled all requests....I want to thank each and every one of you for the fine spirit displayed in doing this service for the fighting forces....I also want to add that good services like this are too few. Yours is one of the first that I have run across in my two years of overseas service and since I have been in all the forward areas, as well as the bases in the rear, I am speaking from experience and sincerely express my gratitude for this type of service... *Lee Morrow, Area Director of*

²²² Letter quoted in "'GI Bundles'--Richmond Tank Builders Keep South Pacific Servicemen Happy," *The Labor Herald*, 22 September 1944, 2.

²²³ Frank Vivian to Gen. Levin H. Campbell, Jr., letter dated 30 September 1945, HFM Acc. no. 89, box 1, Richmond Branch WWII Awards & Correspondence folder.

Recreation, American National Red Cross, South Pacific and Southwest Pacific

If you've ever been alone, and out of no where a friend came in, you'll know how the books were received here in the bush of Australia. *"Yanks down under"*

Were you here to see the faces of our nurses when your magazines were delivered, you would feel amply repaid for the effort put forth in procuring same. For the majority of us it was the first opportunity we have had to read, yes, even see a Good Housekeeping, McCalls, Cosmopolitan or Ladies' Home Journal for many long months. Needless to say, they were snatched up very eagerly and they will pass through many hands, I assure you. *Chief nurse of a service hospital in France*

You'll never know just how pleasant was the surprise that the men of this installation had upon opening a water-proofed Armored Car M-8 yesterday and finding your bundle of magazines. *An Ordnance gang of twenty men in Italy*²²⁴

The last of the letters bore the date 29 September 1944 and referred to a bundle bearing the date 21 July 1944. The fact that only two months separated placing the bundle in a vehicle and a group of soldiers writing a letter back to Richmond is testimony to how quickly vehicles were shipped overseas to the theatres of the war once they had been readied for shipment at Richmond.

Those who received the bundles were not only appreciative of the periodicals, as the following quote demonstrates:

We can safely say that RTD [Richmond Tank Depot] has a much better record for equipment arriving in good shape than any other Depot we've received equipment from; and don't think that isn't very vital when time is very short. *Somewhere in the Pacific*²²⁵

Some of the letters Vivian and his crew received were from servicemen who were also members of UAW Local No. 560, which represented the Ford workers at the Richmond Tank Depot. Those servicemen were also appreciative of the fact that the local sent them issues of the Richmond plant's shop paper. One soldier thanked the local for sending him the paper, which "keeps us informed of the home front we are fighting to defend."²²⁶

In July 1945, Vivian and his boilerhouse gang folded the 8' x 12' American flag that had flown over the Richmond Tank Depot for 3-1/2 years and placed it, accompanied by a letter and a poem, in an M8 armored car bound for the Pacific theatre. The letter explained to whoever unpacked the flag how much the Ford workers at the Richmond Tank Depot loved it, that it represented their "high-spirited efforts in helping to win this terrible war," and that the Richmond workers hoped that the victorious American soldiers and Marines would be able to fly that

²²⁴ "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 89-91.

²²⁵ "Richmond Tank Depot, Vol. III, 1 January to 31 March 1945," 198.

²²⁶ "'GI Bundles'--Richmond Tank Builders Keep South Pacific Servicemen Happy," *The Labor Herald*, 22 September 1944, 2.

particular flag atop the tallest flagpole in Tokyo. The poem expressed in verse Vivian's and his fellow workers' patriotism and their commitment to the cause for which the U.S. fought in the war.²²⁷

Frank Vivian was the member of UAW Local 560 with the most seniority at the Richmond branch, having started with the Ford Motor Company in 1913. Ford put him in charge of the assembly line at the Panama Pacific Exposition in 1915 (see history of Ford's San Francisco branch plant in Chapter II). He continued with Ford at its San Francisco branch until the company opened its Richmond branch 1939, and Vivian moved there with the company. He again participated in Ford's exhibit at the 1939-1940 Golden Gate International Exposition, located on Treasure Island in the San Francisco Bay. The landscaping there inspired Vivian to develop gardens around the power plant at the Richmond plant. During the war, he converted those gardens to Victory Gardens, planting vegetables instead of flowers. Ever the loyal Ford employee, he also wrote a March 1944 letter to Adm. Emory S. Land of the Maritime Commission recommending that one of the Liberty ships being built at the nearby Kaiser shipyards in Richmond be named for Edsel Ford, who had recently died while president of the Ford Motor Company. Land responded to Vivian, writing that the Maritime Commission had intended to give Edsel Ford's name to a Liberty ship built at Savannah, Georgia, because the Ford family had a country home nearby, but the Ford family asked that a ship not be named for him. For his enthusiastic efforts on a variety of fronts, Vivian was a frequent subject of newspaper articles and favorable reports by army officers.²²⁸

The Richmond Tank Depot also mounted periodic War Bond Drives. In November 1944, the plant held its sixth drive, dividing Ford personnel into seven groups and setting a quota for each, with the total for the plant set at \$124,950. Within three days, the employees in every group had exceeded their quotas, and UAW Local 560 purchased an additional \$1,075 in War Bonds. Total collected at the plant for that drive was \$142,185. Enthusiasm for War Bonds was not always high, however. During the seventh drive in June 1945, the Richmond plant barely exceeded its quota, and not until after considerable cajoling by Ordnance staff. One explanation for the difficulty in meeting the quota was that many employees, who might otherwise have purchased bonds, quit before the drive, while new hires had already purchased bonds as individuals.²²⁹

President Franklin D. Roosevelt died on 12 April 1945, a Thursday. His successor, Harry S. Truman, asked that all plants engaged in war production continue full work schedules, holding any commemorative services either Saturday or Sunday. Workers at the Richmond Tank Depot paused for five minutes of silence twice on Saturday, April 14, once during the day shift at 10:00

²²⁷ "Richmond Tank Depot, Vol. V, 1 July to 30 September 1945," 22-23, 68-71. Text of the letter and the poem are exhibits to the report on pp. 68-70; a photo of Vivian and some of the women who comprised the boilerhouse gang appears on p. 71.

²²⁸ "GI Bundles," 2; "Richmond Branch Employee", 6; Robert H. Wall, "He Keeps Them Flying," ms dated 25 March 1943 and attached to Maj. Dick R. Reed to District Chief, letter dated 27 March 1943; Frank Vivian to Emory S. Land, letter dated March 1944; Land to Vivian, letter dated 7 April 1944, all items in HFM Acc. no. 89, box 1, Richmond Branch WWII Awards & Correspondence folder.

²²⁹ "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 59; "Richmond Tank Depot, Vol. IV, 1 April to 30 June 1945," 171-172.

am and once during the evening shift at 5:00 pm, to honor their fallen president.²³⁰

May 8th was V-E Day. The news was broadcast at 6:00 am Pacific time. Most of the day-shift production workers at the Richmond Tank Depot did not hear the news immediately because they were in transit to work, which began at 6:30 am. V-E Day evolved as a normal work day, because there was still a war to be won in the Pacific. Ordnance and Ford employees expressed any jubilation they may have felt without taking time off from work. By early August, Japan's surrender appeared imminent. To avoid any celebratory damage to property owned by the government or the Ford Motor Company, Ordnance and Ford management posted notices on a plant bulletin board that a plant holiday would begin as soon as news of the end of hostilities arrived. In an August 10th telegram, Colonel Harmon of the San Francisco Ordnance District authorized the Richmond Tank Depot to pay all workers sent home on the anticipated V-J Day for a full shift. There were 379 workers at the Richmond Tank Depot during the night shift of August 14th, when news of Japan's surrender arrived, at which time those workers were sent home. All 1,138 employees working on Ordnance contracts then received a two-day holiday.

²³⁰ "Richmond Tank Depot, Vol. IV, 1 April to 30 June 1945," NARA, RG-156, Entry 646, box A601, p 6.

CHAPTER FIVE: ORGANIZED LABOR AT THE RICHMOND BRANCH

Previous chapters have described some of the kinds of work performed by shop-floor workers at the Richmond plant, both before and during the war. Much of it was grueling and repetitive work. Moreover, Ford management sometimes treated workers poorly. For these reasons, workers at Richmond, as elsewhere in the U.S., sought to organize themselves into unions so that they could collectively negotiate with their employer concerning wages and working conditions. This chapter describes those efforts by the Richmond workers in the context of union organizing nationwide throughout the auto industry. Shortly after the Richmond workers finally brought Ford to recognize their union in 1941, the U.S. entered World War II, ushering in a new set of working-place issues, which this chapter also describes. As in the rest of the country, the war changed the employment landscape in Richmond, and many more women joined the workforce. The chapter closes with an overview of the experiences during the war of women workers at the Richmond plant.

A. Organized Labor in the Auto Industry

Ford workers at the Richmond branch formed union organizing committees in January 1937. Their efforts to seek recognition of their union took place in the context of a wave of labor organizing throughout California and the nation in the 1930s. Much of this activity took place because for the first time in U.S. history, with the passage of the Wagner Act in 1935, workers who wanted to organize themselves for the purpose of collective bargaining with their employers had the explicit protection of the U.S. government. The Wagner Act established the National Labor Relations Board (NLRB), with which workers could register their complaints and seek redress when employers engaged in unfair labor practices. The NLRB defined as unfair such practices as union espionage, supporting company-affiliated unions, imposing sanctions on union members, and refusing to recognize and negotiate with workers' unions. Franklin Roosevelt's re-election in 1936 appeared to be an endorsement of his New Deal programs, including the Wagner Act, which further emboldened workers to organize themselves and the NLRB to protect them. One union that took bold action after the 1936 election was the United Auto Workers (UAW), formed only a year earlier. Early in 1937, 1500 workers in two General Motors (GM) plants in Flint, Michigan, enacted a sit-down strike, borrowing a tactic that had worked successfully for meatpackers in Austin, Minnesota, and rubber workers in Akron, Ohio, earlier in the 1930s. The GM workers barricaded themselves in the factories for more than six weeks before GM finally agreed in February to recognize the workers' UAW local and begin negotiations with the UAW for contracts covering workers and locals at GM plants elsewhere in the U.S. as well.²³¹

The GM workers' success had energized others in Detroit and industrial workers elsewhere in the country to use the sit-down to gain recognition of their unions. Within a week of the UAW victory in Flint, 5000 cigar makers in Detroit occupied five plants. A few weeks later, 17,000 strikers occupied all nine of Chrysler's Detroit facilities. In 1937, there were almost 500 strikes in the U.S. that featured sit-downs lasting one day or more. That year, the nation saw a record 4,760 strikes, most of which were aimed at gaining union recognition. Some large

²³¹ Nevins and Hill, *Ford: Decline and Rebirth*, 47-50, 133-135; Milton Derber and Edwin Young, *Labor and the New Deal* (New York: Da Capo Press, 1972 reprint of 1957 edition by University of Wisconsin Press), 170-172; Steve Babson, *The Unfinished Struggle: Turning Points in American Labor, 1877-Present* (New York: Rowman & Littlefield Publishers, Inc., 1999), 95-98.

corporations recognized unions without a strike. For example, U.S. Steel recognized the Steel Workers Organizing Committee in March 1937 without a strike, agreeing to establish a formal grievance procedure. Later that year, the Brotherhood of Sleeping Car Porters gained recognition from the Pullman company, becoming the first African-American union to negotiate a collective bargaining agreement.²³² California workers in many industries joined this upsurge in efforts to gain recognition. In northern California, for example, cannery workers continued to mount strikes at numerous facilities. It was in this context that UAW Local No. 76, which had recently gained recognition by GM in Oakland, turned its attention to assisting workers at the Ford plant in Richmond in organizing.²³³

Another important facet of the context in which Richmond's UAW local arose was the growing rift between the old American Federal of Labor (AFL) and the new Committee for Industrial Organization (soon to become the Congress of Industrial Organizations, or CIO). The unions that comprised the AFL were old trade unions, each of which represented a particular craft, skill, or trade, like carpenters, machinists, railway conductors, and cigar makers. Each union prided itself in the skills its members possessed, and they often demonstrated little concern for workers who had other skills or for unskilled workers. Therefore, many large industrial enterprises had several groups of workers represented by different unions, often with competing interests, and those enterprises often had another large group of unskilled workers who were not represented by a union at all. Employers had long been able to exploit this lack of unity in the American labor movement, so for decades some labor organizers had advocated industrial unions, which were labor organizations that represented all the workers at a particular plant or in a particular industry regardless of craft, skill, or trade. Early in the twentieth century, the radical Industrial Workers of the World (IWW) had advocated such an approach to organizing workers, gaining some local footholds among, for example, miners and seasonal construction and agricultural workers. Although most American labor organizations remained trade unions, some, such as the United Mine Workers (UMW) and the Amalgamated Clothing Workers (ACW) arose as industrial unions, and locals within the industrial unions, represented all workers at facilities where they were organized.²³⁴

By the early 1930s, many American industrial corporations had become gigantic, employing tens or hundreds of thousands of workers. Despite the hardships of the Great Depression, workers in some industries refused to withstand the hardships placed on them by employers any longer, staging industry-wide strikes to demand recognition of their unions. In 1934, there were strikes among truckers in Minneapolis, cannery workers in California, and dock workers on the San Francisco Bay. The largest such strike involved 350,000 textile workers along the Atlantic seaboard. President Roosevelt and his New Deal allies in Congress, like Sen.

²³² Babson, *The Unfinished Struggle*, 98-103.

²³³ The weekly Contra Costa *Labor Journal*, affiliated with the American Federal of Labor (AFL) covered numerous strikes in Contra Costa and nearby counties. From its first issue in June 1937 onward, the San Francisco *Labor Herald*, affiliated with the Congress of Industrial Organizations (CIO), reported strikes throughout northern California. See also Albert Vetere Lannon, *Fight or Be Slaves: The History of the Oakland-East Bay Labor Movement* (Lanham, MD: University Press of America, 2000), 77-91; "Truce Holds at Stockton As Canneries Idle after Rioting," *Richmond Independent*, 24 April 1937, 1, 6 (photos of Stockton labor violence).

²³⁴ David Brody, *Workers in Industrial America: Essays on the 20th Century Struggle* (New York: Oxford University Press, 1980), 3-81; Robert H. Zieger, *American Workers, American Unions*, Second Edition (Baltimore: The Johns Hopkins University Press, 1994), 3-25.

Robert Wagner, for whom the Wagner Act was named, recognized that workers had to be enabled to democratically create new representative institutions to counter the power of the giant corporations and thus achieve some balance, in keeping with the republican ideals of the nation. At the same time, some union leaders began to realize that the values of the old AFL were inhibiting the formation of such institutions. Therefore, individuals like John L. Lewis of the UMW and Sidney Hillman of the ACW formed the Committee for Industrial Organization in 1935 to foster a mass organizing drive among industrial workers. The CIO formally broke with the AFL in 1937.²³⁵ With that break, CIO and AFL unions often competed with each other for the loyalty of workers being organized at large industrial operations, such as Ford's Richmond branch, as will be described below. In Contra Costa County, the Central Trades Labor Council, affiliated with the AFL, sought to force every union affiliated with both the AFL and the CIO to withdraw from the CIO.²³⁶

Meanwhile, Henry Ford and his top managers, like Harry Bennett and Charles Sorensen, remained the most recalcitrant of the U.S. auto makers. During the spring of 1937, after the UAW had won recognition by GM and was pushing to gain recognition from Chrysler and Hudson, Homer Martin, president of the UAW international, announced that the union would launch a drive to get Ford's recognition as well. Ford's lieutenant Harry Bennett responded that, "Organized labor is not going to run the Ford Motor Company." Bennett was so adamantly opposed to dealing with unions that he sent orders to Richmond that Bulwinkel should respond to the sit-down strike in April 1937 (described below) by calling in the sheriff's department. Bulwinkel wanted to avoid the bloodshed that had ensued at other auto industry strikes, so he counseled against using the police. Despite Bennett's insistence, Bulwinkel avoided the call to the sheriff.²³⁷ Meanwhile, rumors circulated that Ford would close his plants for three years to prevent their being organized. He denied the rumor, but he constantly harangued his workers that they should stay out of unions. The rise in union strength, however, brought dissension to the Ford family. Henry continued to refuse to have anything to do with them, while his son Edsel advocated that the company should try to negotiate an agreement with the unions. Undaunted, the elder Ford vowed to do everything in his power to resist the unions and even work to rescind the Wagner Act. His company began to employ strong-armed tactics in opposing organizing efforts at its plants in Dearborn, Kansas City, and Dallas, leading to a new term, "the Ford

²³⁵ Nevins and Hill, *Ford: Decline and Rebirth*, 50-51; Zieger, *American Workers, American Unions*, 26-46; Jeremy Brecher, *Strike* (Boston: South End Press, 1972), 150-177; Nelson Lichtenstein, *State of the Union: A Century of American Labor* (Princeton: Princeton University Press), 21-48.

²³⁶ Contra Costa *Labor Journal*, 19 March 1937, 1. The split between the CIO and the AFL is evident in coverage given organizing activities at the Richmond plant. The AFL-affiliated *Labor Journal* covered the early UAW organizing efforts at the Richmond plant, and the two strikes in 1937, but it virtually ignored the UAW's complaint against Ford, filed with the NLRB in early 1938. It also ignored the NLRB's rulings against Ford and in favor of the UAW at the Richmond plant. The CIO-affiliated *Labor Herald*, on the other hand, reported in detail on labor activities at the Richmond plant. In fact, Ford's apparent recognition of UAW Local No. 560 was one of the lead stories on the front page of the *Labor Herald's* inaugural issue of 8 June 1937.

²³⁷ Bennett quoted in "Ford Plants Next in Line for Auto Union Organizers," Contra Costa *Labor Journal*, 16 April 1937, 3. See also "The Reminiscences of Clarence Bulwinkel," 35; Nevins and Hill, *Ford: Decline and Rebirth*, 47-54, 135.

Terror."²³⁸

B. Richmond Sit-Down Strike of 1937

United Autoworkers of America Local 76 had formed in October 1935 at Oakland, representing workers at three General Motors plants there. Frank Slaby had been one of the principal organizers, and the members of the local elected him president. Local No. 76 began recruiting members who worked in the automobile, aircraft, and farm implement industries in the Bay Area. Organizers from the local began distributing union literature outside the Ford Motor Company's Richmond branch in November 1936. By January 1937, enough Richmond employees had joined the union that the local formed organizing committees for the Richmond plant. One of the committees met with Ford managers of the Ford plant to register complaints that two union members, A. Gonsolves and A.L. Gullickson, had been fired for joining the union. Although those grievances were resolved informally, conflict continued to simmer as union members began to select shop stewards. Ford management demoted some of the shop stewards when it learned of their identities. When a committee of the local met with Ford managers to complain of the demotions, the company responded that it would recognize the union committee and try to resolve the grievances. Meanwhile, foremen in the plant began to harass shop stewards, accusing them of being radicals, "Red," and communists. They referred to the president of the local as "Red" Slaby. Foremen tried to convince union members that their allegiance would hurt them, not help.²³⁹

It became clear to the union that Ford was not going to recognize the shop stewards the workers at Richmond had selected. Meanwhile, working conditions grew worse in April as Richmond managers rushed to meet deadlines in Ford's contract to produce trucks for the Japanese. Shop stewards tried to file complaints with Ford management, but to no avail. Similar tensions were brewing at Ford's Long Beach plant, where the workers staged a sit-down strike in mid-April. A week later, at midday on Friday, 23 April 1937, while plant manager Clarence Bulwinkel was at a Rotary Club lunch and just after Richmond production workers had returned to work from their lunch break, shop stewards, acting on behalf of Local 76, called for a sit-down strike of workers at the Richmond plant to gain Ford's formal recognition of the union. That afternoon, Slaby drove from Oakland to Richmond to take charge of the strike. At 11:00 pm, he announced that Ford had promised to negotiate with union officials. In celebration, workers organized an impromptu midnight parade, said to be 5 miles long, that wove through the streets of Richmond before processing through Berkeley to Local 76 headquarters in Oakland. Believing they had an agreement in hand, union members agreed to go back to work on Monday,

²³⁸ "Ford Plants Next in Line for Auto Union Organizers," 3; Nevins and Hill, *Ford: Decline and Rebirth*, 137-139, 150-151. "The Ford Terror" is described in the latter, p 150.

²³⁹ Charges by UAW Local 76 against Ford Motor Company, Case No. XX-C-71 dated 5 January and 22 January 1937, NARA RG-25, Entry 155, box 130, Ford Motor Company, Richmond, CA; E.S. Neal, Progress Report No. 1 in Case No. XX-C-71 dated 9 March 1937, NARA RG-25, Entry 155, box 130, Ford Motor Company, Richmond, CA; Thomas H. Kennedy, "Intermediate Report," unpublished National Labor Relations Board report dated 2 September 1938, HFM Acc. No. 51, box 8, Richmond, CA, folder, p. 1-6; National Labor Relations Board, "Decision and Order," 21 February 1941, HFM Acc. No. 51, box 8, Richmond, CA, p. 4-6; W.F. Williamson to I.A. Capizzi, letter dated 7 February 1941, HFM Acc. No. 51, box 8, Richmond, CA, Correspondence folder; "UAW Open Meet Swells Ranks of Local Union 76," *Contra Costa Labor Journal* (16 April 1937): 1.

which they did.²⁴⁰

Two days after the April 1937 sit-down strike at Richmond, Ford officials met with a committee representing the UAW local, including UAW vice president Ed Hall from Detroit. The Ford officials introduced an individual named John Adams, who, the Ford people said, would begin representing the company in labor negotiations. Adams, whose real name was John Gillespie, made certain assurances to the union members. In response the workers ended the strike, believing the company had recognized their union. By late May, however, it became apparent to the workers that the Ford company had not recognized their union and was not trying to attend to grievances, so the union called a walk-out. At subsequent meetings, the UAW's negotiating committee proposed written agreements under which Ford would recognize the union as the sole bargaining representative of workers at the Richmond plant, but Ford officials refused sign. During this second strike, the International Association of Machinists also made a brief effort to organize workers at the Richmond branch. At a June 4 meeting between the Local 560 and Ford management, the union informed the company that of the total 1,316 production workers at the Richmond branch, 1,120 of them wanted Local 76 to represent them when bargaining such issues as wages and working conditions. Adams, claiming to represent the Ford Motor Company, agreed to certain of the union's demands concerning grievances and seniority, but he said that Ford would not agree to formally recognize the union. He called the other agreements he had made with the union a kind of back-door recognition. With those assurances, the union ended the strike.²⁴¹

²⁴⁰ "Sit-Down Strike At Ford," *Richmond Independent*, 23 April 1937, 1, 3; "Parley Ends Ford Strike," *Richmond Independent*, 24 April 1937, 1, 3; "Ford Plant Work," *Richmond Independent*, 26 April 1937, 1; "Ford Plant Schedule Is Resumed," *Richmond Independent*, 27 April 1937, 1; "The Reminiscences of Mr. Clarence Bulwinkel," 34. There are some excellent photos of the strikers on p. 3 of the 24 April issue.

²⁴¹ "Ford Recognizes Auto Union After Sit-Down Strike," (Contra Costa) *Labor Journal*, 30 April 1937, 1; "Ford Plant to Stay Shut, Edict As Strike Is Called," *Richmond Independent*, 26 May 1937, 1, 8; "Ford Strike Is Unbroken," *Richmond Independent*, 27 May 1937, 1, 4; "Strike Action Disputed by Union Heads," *Richmond Independent*, 27 May 1937, 1, 4; "Ford Strike Siege Is Seen," *Richmond Independent*, 28 May 1937, 1, 6; "A.F.L. Organizes Ford Men," *Richmond Independent*, 29 May 1937, 1, 3; "Union Groups Contest Right to Represent Ford Men," *Richmond Independent*, 31 May 1937, 1, 2; "Ford Strike Spread to Other Plants Threatened," *Richmond Independent*, 1 June 1937, 1, 2; "Slaby Files Charges in Ford Strike," *Richmond Independent*, 1 June 1937, 1; "Food Asked for Ford Strikers," *Richmond Independent*, 2 June 1937, 1; "Membership in Unions May Be Settled," *Richmond Independent*, 2 June 1937, 1, 3; "Ford Strike End Forecast," *Richmond Independent*, 3 June 1937, 1; "Ford Peace Parley Is Held," *Richmond Independent*, 4 June 1937, 1, 6; "New Effort for Ford Peace," *Richmond Independent*, 5 June 1937, 1; "Charges Fly in U.A.W., Ford Row," *Richmond Independent*, 5 June 1937, 1; "Ford Plant Here Reopened," *Richmond Independent*, 7 June 1937, 1, 3; Weekly Report on Case No. XX-C-71 for week ending 1 May 1937, NARA RG-25, Entry 155, box 130, Ford Motor Company, Richmond, CA; "Amended and Supplemental Charge," charge filed by the NLRB and UAW against Ford Motor Company dated 19 January 1938, HFM Acc. No. 51, box 8, Richmond, CA, Correspondence folder; Kennedy, "Intermediate Report," 5-8, 39-41; NLRB, "Decision and Order," 1, 7-8; W.F. Williamson to F.A. Thomson, letter dated 21 June 1938, HFM Acc. No. 51, box 8, Richmond, CA, Correspondence folder; Press "Release by committee of 12 employees of Ford Motor Company, Richmond, California, who are members of UAW," NARA RG-25, Entry 155, box 130, Case No. XX-C-170, Ford Motor Company, Richmond, CA; "Petition for Investigation and Certification of Representatives Pursuant to Section 9(c) of the National Labor Relations Act," petition dated 2 June 1937, NARA RG-25, Entry 155, box 130, Case No. XX-C-125, Ford Motor Company, Richmond, CA.

In his Ford Motor Company oral history, M.L. Wiesmyer considered Gillespie a very untrustworthy character. Wiesmyer was also critical of Bennett's unsavory business methods regarding unions and other business matters; see "The Reminiscences of Mr. M.L. Wiesmyer," 104-105, 121-123, 142-143. Wiesmyer's reminiscences from within the Ford management structure reinforce a conclusion that Bennett's use of Gillespie in negotiations with the Richmond workers was an underhanded tactic.

Meanwhile, the Ford company continued its anti-union campaign. The company formed an organization called the American Auto Workers Union and urged its employees to join it rather than the UAW. Officials distributed literature, including a booklet titled "Ford Almanac for July 1937," designed to discourage workers from joining the union. A Ford foreman parked his car outside a union meeting and observed workers arriving and leaving.²⁴²

It had been Ford's practice to close the Richmond plant each year in September to modify the assembly line for the coming year's model cars. The company suspended the employment of most workers but retained others to make the changes in the plant. Then, when the company was ready to resume production it would call old workers back. In 1937, when the Richmond plant closed for the season on September 3, there were about 1,260 employees, of whom the UAW claimed 939 as members. The 1937 closure lasted longer than usual, causing the Richmond City Council to adopt a resolution urging Ford to open the plant as soon as possible. At the end of the year, Ford shipped cars assembled elsewhere in Richmond's territory, apparently to forestall the re-opening of the Richmond branch. In early December, Adams met with laid-off employees who were still members of the union. He informed them that Ford would soon resume operations at Richmond and that all the previous employees would be rehired, but that they would have to disband their grievance committee, eliminate their shop stewards, and quit the union. He tried to assure them that Ford's Long Beach branch was doing well without shop stewards. The plant re-opened on December 9, and the company rehired about 680 workers. The union noticed that many shop stewards, union officers, and members of committees had not been rehired. The UAW therefore filed a formal complaint with the National Labor Relations Board NLRB in May 1938, claiming that 150 former Ford employees at Richmond had not been rehired because they had joined the union or had helped in the union organizing.²⁴³

As it turned out, John Gillespie, the individual who had introduced himself as Adams, began appearing on Ford's behalf at other meetings in the Bay Area, such as a meeting with the NLRB in San Francisco and with officers of the union local in Oakland. At those meetings, however, he used other names, like J.H. Peterson, who was a Ford official in Detroit, and Moore. At the NLRB meeting in June 1937, for example, C.A. Bulwinkel (Richmond plant manager), R.S. Harrison (Richmond plant superintendent), and Pat Smith (Ford Motor Company personnel department, Detroit) accompanied Adams as he impersonated Peterson, and they did not reveal to the NLRB officials Adams' true identity. In December 1937, after Gillespie appeared as Adams at a meeting with the Richmond workers to urge them to abandon the union so that they could be rehired, he met in Oakland with UAW leaders, introducing himself as a man named Moore. Some Richmond workers happened to be at the Oakland meeting, and they recognized Moore as the man who had presented himself to them in Richmond as Adams, a representative of Ford. After the December 1937 meeting with the union, at which he had said Ford would rehire all the

²⁴² "Amended and Supplemental Charge," 19 January 1938; NLRB, "Decision and Order," 1, 7-8. The latter includes quotes from the Ford Motor Company's anti-union literature.

²⁴³ Kennedy, "Intermediate Report," 7-9; NLRB, "Decision and Order," 2, 11, 25; W.F. Williamson to F.A. Thomson, letter dated 26 May 1938, HFM Acc. No. 51, box 8, Richmond, CA, Correspondence folder; "Demand Reopening of Richmond Plant," *Labor Herald*, 1 December 1937, 1, 4.

employees, "Adams" was not seen again representing Ford in labor negotiations.²⁴⁴

In the midst of Ford's anti-union campaign and the autumn 1937 shutdown of the Richmond branch, the Richmond auto workers decided in early November by a vote of 113 to 42 to leave Local No. 76 and form their own local. This move was contrary to the advice of Local No. 76 president Frank Slaby and of Harry Bridges, the well-known leader of the Longshoremen's union in San Francisco. On 18 November 1937, the UAW issued a charter to Local 560 in Richmond. The initial officers of the new local were: Robert Phillips, president; Harry Morrison, vice president; Mike O'Donnell, secretary-treasure; Palmer Myhre, Stanley Schofield, and William Floor, trustees. Meanwhile, the new Richmond local sent a delegate to Detroit to participate with representatives from Long Beach and other Ford branch operations as well as from Ford's Michigan plants in launching a nationwide effort to gain Henry Ford's recognition of the union. The focus of the drive would be on organizing Ford's Dearborn and Detroit operations, and the UAW chose thirty-five organizers to work with employees there.²⁴⁵

The law firm Williamson & Wallace of San Francisco represented Ford during the NLRB investigation of the Richmond workers' complaint. As soon as management at Richmond learned that the union had filed the complaint, W.F. Williamson met with NLRB regional director Alice M. Rosseter in an effort to learn the nature of the union's grievance. In addition to complaining that most of the strike committee and the union's shop stewards had not been rehired, Local 560 asserted that Adams had promised they would get their jobs back. The union also voiced suspicion, because they had begun to realize that Adams, whose real identity was Gillespie, was operating under several identities. It had led the workers to doubt that Ford was negotiating with them in good faith. Not knowing how the firm should represent the company with regard to this issue, Williamson & Wallace initially took the stance at meetings with Rosseter that the various people Gillespie claimed to have been were actually present at meetings. The firm, though, was in a difficult position: should it assert to the NLRB that Ford had negotiated with the union, even though the person representing the company used a false identity? or should it assert to the NLRB that Ford had not negotiated with the union because "Adams" was not a legitimate representative of the company, even though other Ford officials had been present at those meetings?²⁴⁶

The firm also began investigating the current status of individuals who were named in the complaint, hoping to find that they had quit voluntarily or were working elsewhere. After a brief investigation, the firm assured Ford headquarters in Dearborn that the workers' complaints about

²⁴⁴ Kennedy, "Intermediate Report," 6-7 NLRB, "Decision and Order," 26-29; Williamson to Thomson, letter dated 26 May 1938; Memo for Files, NLRB memorandum describing meeting with Ford Motor Company representatives dated 4 June 1937, copy of memo in two locations, HFM Acc. No. 51, box 8, Richmond, CA, Correspondence folder, and NARA RG-25, Entry 155, box 130, Case No. XX-C-170, Ford Motor Company, Richmond, CA. See also a summary of Gillespie's activities in the Bay Area in "Take Ford Co's Word with a Grain of Salt," *The Labor Herald*, 14 March 1941, 4. For an alternate view of Gillespie, see "The Reminiscences of Clarence Bulwinkel," 36. Bulwinkel considered Gillespie to be a very capable and valuable labor negotiator.

²⁴⁵ "Desert Leaders," *San Francisco Voice of the Federation* (11 November 1937): 3; "National Ford Drive Mapped," *Labor Herald* (17 November 1937): 6; NLRB, "Decision and Order," 1; "Local Unit of U.A.W. Formed," *Richmond Independent* (6 December 1937): 4.

²⁴⁶ W.F. Williamson to F.A. Thomson, letters dated 4, 11, 14, 17, and 20 May 1938, HFM Acc. No. 51, box 8, Richmond, CA, Correspondence.

not being reinstated were groundless and that the present condition among those employed at the Richmond branch was contentment. After a more thorough investigation, however, Williamson & Wallace found that several men with good work records and considerable seniority, some of whose employment at Ford went back to 1922, had not been rehired. It began to appear that the union had good grounds for its complaint. Yet, the firm recommended to the Richmond management that the company should try to avoid an NLRB-sanctioned election, because the workers would undoubtedly vote to have the UAW represent them. The question facing top management in Dearborn was whether to acknowledge that Ford, in the person of "John Adams," had recognized the union at 1937 meetings, or to deny that Ford had recognized the union. In the case of the latter, there almost certainly would be an NLRB-sanctioned election.²⁴⁷

Ford's response notwithstanding, the UAW and workers at the Richmond branch petitioned to have Ford officially recognize Local 560 as the workers' representative in June 1938. The union claimed that a majority of the workers at Richmond had designated Local 560 as their representative and that Ford was not recognizing the local. Meanwhile, Williamson & Wallace had changed its opinion concerning the advisability of an election. The firm had been interviewing foremen at the plant, and they now believed that anti-union sentiment was quite high among the current workers. The NLRB hearing began on 20 June 1938. The union presented witnesses who testified that during all the recent periods that the Richmond plant was operating, both before the September 1937 closer and after the December 1937 re-opening, a majority of the production workers were either union members or had applied for membership. They also testified that, regardless of Gillespie's actual status as a representative of the company, Richmond managers like Bulwinkel and Harrison had assented to agreements Gillespie had made with the union. For these reasons, the union asserted that it should be recognized as the workers' bargaining agent.²⁴⁸

The NLRB hearing in the Richmond matter began June 20th and ended after three weeks of testimony on July 9th. NLRB examiner Thomas Kennedy heard testimony from about half the individuals named in the complaint. Kennedy issued his preliminary report on September 2nd. The NLRB examiner determined from the hearings that the Ford Motor Company at Richmond had engaged in unfair labor practices. Although Kennedy dismissed a small number of the complaints, he found that the reason most of the men were not rehired was clearly their union activities. The examiner also made recommendations for men not interviewed during the hearing, determining that they, too, had more seniority than many of the men who had been rehired and that they would have been rehired had they not participated in union activities. At the conclusion of his report, Kennedy recommended that Ford reinstate the men who had been unfairly not rehired. Moreover, he recommended that Ford not discourage its employees from joining Local 560 and that Ford recognize Local 560 as its production workers' representative at the bargaining table. In October, Williamson & Wallace filed an exception to the report on Ford's behalf. The NLRB did not issue its final order in the case until February 1941, essentially upholding Kennedy's recommendations. As part of the ruling, the NLRB ordered that Ford rehire 143 men who had wrongfully not been rehired and that Ford compensate them with back pay.

²⁴⁷ Williamson to Thomson, letters dated 14, 17, 20, and 26 May 1938.

²⁴⁸ "Petition for Investigation and Certification of Representatives Pursuant to Section 9(c) of the National Labor Relations Act," petition dated 7 June 1938, HFM Acc. No. 51, box 8, Richmond, CA, Correspondence folder; Williamson to Thomson, letters dated 9, 11, and 23 June 1938, HFM Acc. No. 51, box 8, Richmond, CA, Correspondence folder.

The NLRB, incidently, had ruled in the union's favor in the Long Beach case as well.²⁴⁹

At the national level, Ford management continued to refuse to recognize UAW locals at its Detroit, Dearborn, and branch plants, and labor continued to battle for recognition of its union. When organized labor learned that Ford had been awarded a contract for the experimental jeeps in late 1940, labor's voice on the National Defense Board, Sidney Hillman, protested to no avail that the government should not contract with Ford if the company refused to operate within the nation's labor laws. In early 1941, Ford submitted the low bid to make nearly 12,000 trucks for the War Department, but this time the government insisted on including a clause in the contract that Ford abide by the Wagner Act and the Wages and Hours Law. When Ford refused, the War Department awarded the contract to the next highest bidder. In Michigan's contentious climate of red-baiting by Ford managers and Ford attorney I.A. Capizzi, and with former UAW president Homer Martin having been recruited by Ford to organize a competing auto workers union affiliated with the AFL, called the Federal Labor Union, the UAW was nevertheless able to implement a successful strike, when 85,000 workers in Detroit and Dearborn walked off the job in April 1941. After ten days, the strike finally induced Ford to meet the union's demands. Among them was an NLRB-sanctioned election, held on May 21. Of some 80,000 workers from Ford's River Rouge, Highland Park, and Lincoln plants casting ballots, 51,868 voted for the UAW and 26,132 voted for the AFL affiliate. Only about 2,000 workers voted against union representation. In the wake of the election, Ford agreed to sign a contract stating that the UAW would represent Ford's 120,000 production workers, including the 1,300 men working at Richmond.²⁵⁰

Things were not quiet in Richmond as members of Local 560 watched events unfold in Detroit. *The Labor Herald* reported that on the Friday in February after the NLRB issued its order, the Ford service department at the Richmond plant warned the paperboy, who sold newspapers at the plant gate, not to shout any headlines about the decision. By 1941, operations at the Richmond branch had greatly expanded, as described in previous sections, and most of the union members against whom Ford had discriminated in 1937 and 1938 were now reportedly back at work. Therefore, when the NLRB issued its final order, Ford petitioned for a rehearing, claiming that the rehiring of employees subsequent to the controversy but prior to the NLRB order showed that Ford had not discriminated against the union members. The NLRB dismissed the appeal. Meanwhile, Ford tried to offer the aggrieved workers at the Richmond plant a settlement independent of the NLRB order, offering to pay 31.5 percent of the back pay and leave

²⁴⁹ "7 Times for Ford: 'Guilt As Charged'," *The Labor Herald*, 28 February 1941, 1; Kennedy, "Intermediate Report," 9-38, 44-46, schedules A, B, C, & D; NLRB, "Decision and Order," 11-23, 34-35; Williamson to Thomson, letter dated 30 July 1938, Williamson to Bulwinkel, letter dated 30 July 1938, Williamson to I.A. Capizzi, letter dated 7 February 1941, Williamson to B.J. Craig, letter dated 11 August 1941, all in HFM Acc. No. 51, box 8, Richmond, CA, Correspondence folder. Pages 9-38 of the "Intermediate Report" summarize the information provided by individuals at their interviews. There are similar summaries of workers' stories in NLRB, "Decision and Order," 11-23. Schedule A lists the men not interviewed for whom the complaint was dismissed. Schedule B lists the men not interviewed for whom the complaint was upheld. Schedule C lists the men interviewed for whom the complaint was upheld. Schedule D lists the men interviewed for whom the complaint was dismissed.

²⁵⁰ "Henry Ford Gets Two Million Bucks," *The Labor Herald*, 3 January 1941, 1; "Ford Gets a Taste of Justice," *The Labor Herald*, 7 February 1941, 1; "Ford Fascism Crumbles," *The Labor Herald*, 18 April 1941, 1; "Ford Election Set," *The Labor Herald*, 18 April 1941, 1; "Americanize Ford with Historic CIO Pact," *The Labor Herald*, 18 April 1941, 1, 3; Sol Dollinger and Genora Johnson Dollinger, *Not Automatic: Women and the Left in the Forging of the Auto Workers' Union* (New York: Monthly Review Press, 2000), 63-70; Nevins and Hill, *Ford: Decline and Rebirth*, 156-167.

the other issues to litigation. Ford did not authorize the Richmond branch managers to negotiate with the union how the workers' back pay would be calculated, however, nor were the managers authorized to negotiate any other matters with the union. Ford's refusal to meet with local union representatives led to brief continuation of the controversy, but Ford eventually complied with the order to the union's and the NLRB's satisfaction late in the summer.²⁵¹

Although Ford reinstated workers following the NLRB's February order and posted notices around the Richmond plant assuring workers of their right to join unions, the company did not actually recognize the Richmond local of the UAW. In April, Ford foremen at Richmond urged their workers to join Local No. 22669 of the AFL entity, the Federal Labor Union. Then in May, while workers in Detroit and Dearborn were voting in the NLRB-sanctioned election, the AFL local in Richmond suggested that the Richmond workers vote to elect officers of Local 22669. Local 560 of the UAW cautioned Richmond workers that this was merely a ploy by the AFL to give Local 22669 some patina of official standing. Recognition of Local 560 finally came in June, when Ford signed contracts with the UAW nationally, but not before the union and its members had exerted considerable energy in getting Ford to negotiate. Although Local 560 had once boasted that a large percentage of the Richmond workers had joined the UAW, membership had dwindled to a small, active core after the initial organizing drive in 1937. Vince McKenna, president of Local 560, reported in June 1941 that, following the signing of the national contract between Ford and the UAW, there was a healthy rush to join the union by workers at the Richmond plant, both new members and former members who wished to re-establish their good standing with the local. Ford put the last of the aggrieved workers back on the payroll on July 21.²⁵²

C. Labor During WWII

The United States had the highest percentage of its population working in the production of ordnance of all the nations involved in World War II, Allied or Axis. By the same token, other countries had higher percentages of their male populations serving in the military than did the U.S. While in the U.S. only 1 in 6 men served in the Armed Forces, 1 in 4.5 men in Germany and 1 in 5 men in Great Britain and Japan served in those countries' militaries. Even though the U.S. enlisted many of its citizens in armaments production during the war years, the government was nevertheless tolerant of labor strikes. Workers staged work stoppages in 3,000 separate instances across the country in 1942 and 1943. Although workers could strike in Britain as well,

²⁵¹ "Ford's Weird Policies," *The Labor Herald*, 28 February 1941, 4; "Ford Co. Renews Battle at Richmond Assembly Plant," *The Labor Herald*, 11 April 1941, 1; Williamson to Capizzi, letters dated 7 February and 12 July 1941; Williamson to Craig, letter dated 11 August 1941; "Supplemental Decision and Order," NLRB order dated 25 April 1941, HFM Acc. No. 51, box 8, Richmond, CA, Correspondence folder; Lannon, *Fight or Be Slaves*, 89. A copy of a subsequent agreement between Ford and the UAW is included as an exhibit in "Richmond Tank Depot, Vol. I, 1 January to 30 September 1944," 41, exhibit 15.

²⁵² "Ford Co. Renews Battle at Richmond Assembly Plant," *The Labor Herald*, 11 April 1941, 1; "Ford Election Set," *The Labor Herald*, 16 May 1941, 1; "Americanize Ford with Historic CIO Pact," *The Labor Herald*, 27 June 1941, 1, 3.

Nazi Germany and the Soviet Union prevented such behavior.²⁵³ The situation at the Richmond Tank Depot reflected overall national conditions in many ways, as this section describes.

Labor was at least as scarce for Ford's Richmond plant during the war as it was at other factories around the country trying to meet the military's needs for weapons, ammunition, and equipment. Whereas many plants had high turnover rates, the Richmond plant evidently had a relatively stable workforce. In December 1942, A.B. Jewett of the Richmond branch employment department reported to Dearborn that the plant was experiencing a turnover rate of only 4 percent per month. This did not include men who entered military service, because the company did not classify them as having quit. Jewett reported that, in contrast, the Kaiser shipyards in Richmond, where employment stood at 82,000, had a turnover of more than 14 percent each month. Jewett believed that two factors helped the turnover rate at Ford's Richmond plant: 1) the six-day week, and 2) women workers, who quit at a much lower rate than men did.²⁵⁴

Ford's lack of turnover was short-lived, however. For example, there were about 1,500 workers on Ford's payroll at Richmond in 1944, with a peak number of 2,111 in August (see table in the section above on Ford's Production and Processing of Tanks). To maintain that level of employment, Ford had hired 2,109 people during the course of the year, most of whom had never worked for Ford before. During the same year, 2,071 people quit the Richmond plant, only 4.3 percent of whom left to enter the military. Leading up to the August peak in employment, the Richmond plant had sometimes hired as many as 150 new people each week. Many of those summer employees were minors who returned to school in the fall. Reportedly, another reason that many workers left work at the Richmond Tank Depot in 1944 was rumors following the D-Day invasion that the war was essentially over. Some workers left Richmond altogether, returning to their homes elsewhere in the country.²⁵⁵ The following table shows the various durations of workers tenure at the Richmond branch in 1944:

Duration of Employment of Terminating Employees²⁵⁶

	July	December
30 days or less	49.2 percent	37.5 percent
60 days or less	13.4	8.6
90 days or less	9.7	3.8

²⁵³ Alan S. Milward, *War, Economy and Society: 1939-1945* (Berkeley and Los Angeles: University of California Press, 1979): 216-244, as summarized in Alan Gropman, "Industrial Mobilization," in *The Big L: American Logistics in World War II*, ed. Alan Gropman (Washington, DC: National Defense University Press, 1997), 76-77.

²⁵⁴ A.B. Jewett to M.L. Wiesmyer, memorandum dated 15 December 1942, HFM Acc. No. 371, box 16, folder 4.

²⁵⁵ Ford Motor Company, Richmond Branch, Labor Relations Department, "Labor Relations & Employment Records Survey, January-December 1944," unpublished report in HFM Acc. No. 371, box 17, folder 4, pp. 1-3. Maj. Ball's report at the end of 1944, "Richmond Tank Depot, Vol. I, 1 January to 30 September 1944," 13, states that Ford's turnover was only 6 percent per month, which is a slightly lower figure than the approximately 8 percent turnover Ford's Survey showed.

²⁵⁶ "Labor Relations & Employment Records Survey, January-December 1944," 3.

120 days or less	8.2	3.8
150 days or less	5.2	5.8
180 days or less	5.9	10.6
200 days or more	8.2	29.8

At the beginning of 1944, the 284 women on the payroll comprised 19 percent of the workforce. At the end of the year, the 341 women constituted 22 percent of the payroll. The number of African American workers also increased during 1944, beginning with 103 black employees (6.4 percent of the workforce) in March, when Ford began keeping the statistics, and ending the year with 160 blacks on the payroll (10.5 percent).²⁵⁷ That number jumped to 327 African American workers (18.2 percent of the Ford employees) by the end of January 1945.²⁵⁸

Ford also recorded other demographic data about its employees at the Richmond plant during various times. At the end of 1943, the company found that fourteen employees out of 1,310 claimed to have had no schooling whatsoever, 95 percent of them had completed the fifth grade, 80 percent had completed the eighth grade, and 30 percent had completed four years of high school. At the end of 1944, the Ford company surveyed the birthplaces of its employees, finding that only 15 percent were natives of California. As with the employees of other California companies producing in support of the war effort, many of Ford's employees at Richmond (31 percent) hailed from Arkansas, Texas, Oklahoma, and Missouri. A total of forty states were represented on Ford's payroll, along with Alaska, Hawaii, Puerto Rico, and the Philippine Islands. People from China, India, Australia, and fifteen European countries worked at Ford, and among the Latin American countries natives of Mexico, Costa Rica, Nicaragua, Argentina, Brazil, and Peru were represented on the payroll.²⁵⁹

One of the Richmond Tank Depot's labor problems was absenteeism, which Major Ball reported in late 1944 as averaging about 10 percent. It was especially high during the Christmas season, especially among women. One of the methods Ordnance used to try to inspire Ford workers to reduce absenteeism was to have battlefield veterans describe their experiences. One such event took place on 23 January 1945, the day George McFadden received the second of his cash awards for his idea for saving costs in transporting jeeps made at Richmond (see section above on jeeps). Ordnance presented him the award during a program to which all depot employees and their families were invited. During the program, seven veterans of the European theatre (one officer and six enlisted men) gave accounts of their experiences in battle. Introduced as "personal emissaries of Gen. Eisenhower," they recounted the terrible hardships of war and appealed to the workers to continue Richmond's excellent record of production to help speed the end of the war. Captain Spiker reported that the program had no noticeable effect on absenteeism. The day of the program, 8.2 percent of the workers were absent; the following day, 7.2 percent were absent. That compared with an absenteeism rate of 7.2 percent and 6.8 percent

²⁵⁷ "Labor Relations & Employment Records Survey, January-December 1944," 1, 4. The statistics on women workers are reiterated in Fern Hurley, "Women Man the Battle Stations," unpublished, undated (ca. March 1945) report in NARA RG-156, Entry 646, box A578, San Francisco Ordnance District History, Vol. XII, p. 37. Major Ball, "Richmond Tank Depot, Vol. I, 1 January to 30 September 1944," 13, reported that 9.5 percent of Ford's production workers were black and 24 percent were women at the end of 1944.

²⁵⁸ "Richmond Tank Depot, Vol. III, 1 January to 31 March 1945," 18.

²⁵⁹ "Labor Relations & Employment Records Survey, January-December 1944," 5.

for the same two days (Tuesday and Wednesday) the previous week. Workers were especially likely to skip work on Sundays, with 18.9 percent and 23.5 percent missing on 14 and 21 January, respectively. Therefore, the Richmond Tank Depot decided to discontinue Sunday work on 28 January.²⁶⁰

A related problem concerned overtime. In October 1944, all workers at the Richmond Tank Depot, both Ordnance and Ford employees, went from three eight-hour shifts per day to two, with the day shift operating from 6:30 am to 3:00 pm and the swing shift from 3:30 pm to midnight. In January 1945, as shipping orders increased, production workers went on an overtime schedule, working ten-hour shifts, with the day shift running from 6:30 am to 5:00 pm and the night shift from 5:30 pm to 4:00 am. Workers on the night shift did not like that new schedule, so on January 9th, 221 of 367 production workers walked off the job at midnight. The next day, management and union leaders met with the shift. Jewett appealed to the workers' patriotism. Bill Williams, one of the union leaders, reminded the workers that there was a grievance procedure in the union contract for such complaints, and he asked them to follow that procedure, rather than walking off the job. The appeals worked, and night-shift production workers abided by the overtime schedule. By March, however, a new problem arose affecting both shifts: workers who did not want the overtime hours left work after eight hours. By mid-March, as many as 196 men were leaving work early. Captain Spiker appealed to the workers, asking them to be conscientious about the need to maintain production to supply soldiers fighting overseas. The numbers of workers leaving early thereafter declined markedly, but the problem persisted.²⁶¹

In February, the army and navy mounted a publicity campaign called "Man the Battle Stations," aimed at recruiting workers necessary to maintain industrial production through the end of the war. Radio station KSFO broadcast a special program, sponsored by Lucky Lager Beer, growing out of the military's campaign. The program emphasized the work being done at the Richmond Tank Depot. Captain Spiker, commanding officer of the Richmond Tank Depot, took part in a ten-minute interview on station KRE, again stressing the importance of the work being done at Richmond and saying the depot had an immediate need for 100 workers with training in automobile manufacture.²⁶²

During the course of the war, Ford maintained a permanent training program at the Richmond branch to ensure that workers and supervisors had the necessary skills. For example, during 1944 and 1945, Ford hired a total of 4,958 new employees, both men and women, of whom 432 (9 percent) received on-the-job-training in the skills necessary to become electricians, carpenters, draftsmen, engine mechanics, machinists, millwrights, painters, plumbers, radio technicians, steam fitters, tinsmiths, and welders.²⁶³

²⁶⁰ "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 13, 114; "Richmond Tank Depot, Vol. III, 1 January to 31 March 1945," 10-11, 16.

²⁶¹ "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 56; "Richmond Tank Depot, Vol. III, 1 January to 31 March 1945," 18-19, 197-198.

²⁶² "Richmond Tank Depot, Vol. III, 1 January to 31 March 1945," 67-68; a report and a script documenting the broadcasts are included as exhibits SS and TT on pp. 116-128.

²⁶³ "Richmond Branch Operations under Contract W-883-ORD-2676," 3-4.

Ford was not willing to fill all of its openings, however, by training individuals without the requisite skills. This was demonstrated in February 1945, when Bay Area newspapers picked up on the above-described "Man the Battle Stations" publicity campaign and published articles suggesting that the Richmond Tank Depot was willing to hire untrained women. Women applicants who flooded Ford's employment office were turned away, leading Ford employment manager A.B. Jewett, UAW-CIO representative Frank Slaby, and two representatives of Local 560 to call a meeting with Captain Spiker to register their complaints concerning the publicity. Both Jewett and the union representatives told Spiker that they needed male applicants, not female. The reason, however, was not simple prejudice but rather the limits California law placed on the kinds of work employers could ask women to do, such as lift heavy weights. Spiker responded that the newspapers had run the articles without his knowledge, and he promised ask the San Francisco Ordnance District to try to get newspapers to check their facts before publishing such articles.²⁶⁴

Nevertheless, the Richmond Tank Depot continued to have difficulty finding enough workers during the closing months of the war in 1945, as many who had migrated to California for work in wartime industries headed home to other parts of the country. Because of the labor shortage, Ford hired ever greater percentages of blacks and women. Observing the overall trend in July 1945, Captain Spiker wrote:

Before the war, women and negro employees were no problem at the Ford Motor Company for the reason that they were practically non-existent on the employment records. While they present no problems of a serious nature, it is expected that they will be released when the Contract terminates.²⁶⁵

The percentage of women working at the Richmond Tank Depot peaked in October 1944, and the percentage of blacks peaked in February 1945.²⁶⁶

During the ensuing months, demands on production at the Richmond plant declined as did employment levels, but Ford still experienced a labor shortage until June, when schools let out and the company was able to hire boys aged 16 to 18 for the summer. Despite a slight increase in the number of Ford employees at the plant during the summer, workers processing combat vehicles nevertheless had to work considerable overtime because of the orders for production the U.S. Army made during the final push toward victory against Japan. In mid-July 1945, the depot went on twelve-hour shifts for five days and worked ten-hour shifts an additional eight days. The governor of California even authorized the depot to have women work ten-hour days and sixty-hour weeks because of the emergency. Despite the grueling schedule, absenteeism during the week of twelve-hour shifts was the lowest of the month. Immediately after the announcement of Japan's unconditional surrender, demand for production declined, as the only Ordnance work remaining was to prepare vehicles being stored at Richmond for shipment to storage facilities elsewhere. When Richmond got the news of the Japanese surrender, Ford had 1,138 production workers processing combat vehicles; by the end of the

²⁶⁴ "Richmond Tank Depot, Vol. III, 1 January to 31 March 1945," 89-91; "Richmond Tank Depot, Vol. IV, 1 April to 30 June 1945," 188.

²⁶⁵ "Richmond Tank Depot, Vol. IV, 1 April to 30 June 1945," 187.

²⁶⁶ "Richmond Tank Depot, Vol. IV, 1 April to 30 June 1945," 187-188.

month, the number was down to 899. Ford dismissed all of the high-school boys to assure work for men supporting families. The company transferred some of the production workers to work on reconverting the plant to civilian production, and more than 170 production workers quit, either to resume peacetime jobs or to move back to their homes in other parts of the country. Because of CIO seniority rules, the percentages of blacks and women working on the Ordnance contract remained relatively high through the end of October.²⁶⁷ Some of the workers at the Richmond Tank Depot toward the end of the war were men who had received medical discharges from the armed forces after being wounded in battle.²⁶⁸

1. Unions

In November 1943, two employees at Richmond and an organizer of the United Office and Professional Workers of America tried to organize clerical workers at the Richmond branch. They distributed literature to workers outside the Richmond plant, and they scheduled a meeting between clerical workers and the union at the UAW's Local 560 hall at El Cerrito. The organizing effort continued through 1944. In April 1944, the United Office Workers and the CIO filed a complaint with the NLRB on behalf of an office worker whom Ford had discharged. In August, the army recommended the Richmond Tank Depot for its third Army-Navy "E" Award, which would be the second star on the depot's flag. Because a complaint was on file at the NLRB, however, the army delayed notifying the depot of the award. When Local 560 of the UAW heard of the delay, E.D. Fry, secretary-treasurer of the local, wrote Major Ball a letter stating that Local 560 was not associated with the complaint and that the complaint had nothing to do with production workers in the plant. He said delaying the award was unfair to the plant workers who had achieved the record meriting the award, and he therefore asked Major Ball to lift the objection that was delaying the process.²⁶⁹

Another incident that aroused the anti-union concern of Ford management occurred in the spring of 1945, when the plant foremen formed a social group they called the Ford Foremen's Club. They held their first meeting at the Richmond Golf Club, and they instituted a rule that anyone talking about problems at work would be fined a dollar. At the same time, organizers on the West Coast representing the Foremen's Association of America (FAA) were trying to organize a union for foremen at industrial plants. The FAA had been successful in organizing foremen at some automotive plants in Michigan, including Ford's River Rouge plant. To counter

²⁶⁷ "Richmond Tank Depot, Vol. IV, 1 April to 30 June 1945," 187-190; "Richmond Tank Depot, Vol. V, 1 July to 30 September 1945," 23-25, 95, 157-158.

There was a general decline in the percentage of women working in the automobile industry after the war; see Ruth Milkman, "Rosie the Riveter Revisited: Management's Postwar Purge of Women Automobile Workers," in *On the Line: Essays in the History of Auto Work*, eds. Nelson Lichtenstein and Stephen Meyer (Urbana and Chicago: University of Illinois Press, 1989), 129-152. The details of women's experiences at the Richmond Tank Depot have not been examined for this study.

²⁶⁸ "Richmond Tank Depot," Vol. II, part 2, December 1944, photos.

²⁶⁹ Robert Collins to I.A. Capizzi, letter dated 29 June 1944, HFM Acc. No. 51, box 8, Richmond, CA, Correspondence folder; "Richmond Tank Depot, Vol. I, 1 January to 30 September 1944," 13-14, 22-24; "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 13. The latter report (p. 37, exhibit no. 11) includes a copy of the literature the UOPWA-CIO distributed, in the form of a true-false test, to workers during the organizing drive.

the union movement, a group called the California Personnel Managers' Association formed a subsidiary organization called the California Industrial Management Association (CIMA) so that groups like the Ford Foremen's Club could affiliate. The idea was that foremen had a desire to belong to an organization, and by affiliating with the CIMA they would be less susceptible to the possible attractions of belong to a union for foremen. Richmond superintendent W.A. Abbott approved of the steps the foremen had taken and was quick to assure the Ford hierarchy in Dearborn that the Richmond foremen remained opposed to unions. M.L. Wiesmyer wrote back to Abbott, saying the news made him nervous: "We don't think much of the idea of foremen forming any kind of organization whatever." After the initial meeting of the Ford Foremen's Club, however, interest in belonging to an organization began to fade. The group voted not to affiliate with the CIMA, and Ford's labor relations supervisor at Richmond predicted that the club would soon dissolve.²⁷⁰

Meanwhile, production workers at the Richmond branch continued to be represented by the UAW, which maintained a closed shop. Once hired, every production worker, whether man or woman, paid the UAW a \$5 initiation fee. Monthly dues were \$1.50. Workers' complaints were handled under the four-step grievance process established between the UAW and Ford. In 1943, workers filed sixty-nine grievances against the company, and in 1944 they filed 187. Half of the grievances were settled at the first stage in the process in 1943 and two-thirds were settled at the first stage in 1944. Only eight grievances went beyond the second stage in 1943, and eleven went beyond that stage in 1944. One grievance had to be settled by the Umpire (the fourth stage in the process) in 1944. M.A. Williams headed the UAW bargaining unit at the Richmond plant.²⁷¹

An important feature of the labor situation at the Richmond Tank Depot during the war years is that instead of two classes of workers, labor and management, there were four: Ford employees who were members of the UAW, Ford officials, military officers of the Ordnance Department and the Signal Corps, and civil service employees of those two branches of the army. Numerous reports by the commanding officer at the depot describe the generally cooperative atmosphere that existed among the various groups, but one report suggests that comity was not ubiquitous. In his third quarter 1944 report, Major Ball wrote:

At the beginning of 1944 a study was made of the Ordnance plant organization. Two decisions were reached: first, Ordnance personnel would not be increased; and second, relationship with the Contractor would have to be improved in order to meet requirements of both quality and increasing quantities of vehicles for overseas shipment.

Everyone in the Ordnance organization was instructed to refrain from any discussion with the Contractor's personnel involving controversial subjects; all

²⁷⁰ Abbott to Wiesmyer, memorandum dated 3 April 1945, Wiesmyer to Abbott, memorandum dated 9 April 1945, Jewett to Stewart Evans, letter dated 13 April 1945, HFM Acc. No. 371, box 17, folder 4; Nelson Lichtenstein, "The Man in the Middle: A Social History of Automobile Industry Foremen," in *On the Line: Essays in the History of Auto Work*, eds. Nelson Lichtenstein and Stephen Meyer (Urbana and Chicago: University of Illinois Press, 1989), 169-177.

²⁷¹ "Labor Relations & Employment Records Survey, January-December 1944," 5-6; Hurley, "Women Man the Battle Stations," 35, 38.

such cases were to be reported to the Commanding Officer.²⁷²

The report gave no hint of what such "controversial subjects" might be. The following quarter, Ball wrote that attitude and cooperation between Ordnance and Ford were excellent.²⁷³ He did, however, describe details of a subject that could possibly cause friction in a workplace:

The general attitude of the Ordnance personnel is excellent. All the personnel take pride in working for the Government and feel that they are a bit closer to the war effort. These factors offset the lower differential in pay between that of Ordnance and the Contractor. However, considering annual leave, sick leave and other privileges, the conditions are fairly equal. There exists a very desirable attitude between the Contractor's personnel and Ordnance personnel insofar as there is close cooperation, geniality, thorough understanding of each one's job and in general reflects mutual respect.²⁷⁴

2. Women

The increase in the percentage of workers at the Richmond plant who were women, noted above, mirrored a national trend brought about by the mobilization of the population for the war effort. In July 1944, women comprised 36.9 percent of workers in factories working under prime contracts with the government. The segment of America's total work force that was female rose from 25.8 percent before war to a high of 35.4 percent during the war. Although this new demographic of America's industrial workforce signaled a remarkable social change for the nation, it was by no means extreme in comparison with other belligerents in the war. In Britain's civilian labor force, 38 percent of workers were women at the height of the war. In the Soviet Union, women were 38 percent of the work force in 1940 and 53 percent in 1942. German women already comprised 37 percent of the civilian work force before Hitler invaded Poland in 1939; by 1944, 51 percent of German civilian workers were women.²⁷⁵

The mobilization of workers in America's industrial plants was not as easy as simply hiring women to do jobs men had once done. Many women, especially single women and poor women, already were self-employed or had low-paying jobs in domestic service or the textile, clothing, and shoe industries before the war. Some were quick to accept higher pay in military production, but circumstances for others precluded them from taking the new employment

²⁷² "Richmond Tank Depot, Vol. I, 1 January to 30 September 1944," 3.

²⁷³ "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 3.

²⁷⁴ "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 6.

²⁷⁵ Donald M. Nelson, *Arsenal of Democracy, the Story of American War Production* (New York: Harcourt, Brace and Company, 1946), 237; Francis Walton, *Miracle of World War II: How American Industry Made Victory Possible* (New York: Macmillan, 1956), 372, 382-383; Milward, *War, Economy and Society: 1939-1945*, 216-244; Leila J. Rupp, *Mobilizing Women for War: German and American Propaganda 1939-1945* (Princeton: Princeton University Press, 1978), 185; Penny Summerfield, *Women Workers in the Second World War: Production and Patriarchy in Conflict* (London: Croom Helm, 1984), 29; Harold G. Vatter, *U.S. Economy in World War II* (New York: Columbia University Press, 1985), 20; all summarized in Gropman, "Industrial Mobilization," 78-80.

opportunities. Women from rural areas were generally not available, because their work-loads there had already increased to make up for the men who had left farms and small-town businesses for military service. Cities with ordnance manufacturing plants could not import large numbers of women from other areas, even if available, because housing and transportation were already stretched to the limit with the influx of male industrial workers and their families. Federal manpower planners were loath to recruit married women with children, because then the government would need to develop child-care resources, a burden they hoped to avoid. They focused their attention on a demographic they labeled the "idle" reserve, who were recent high school graduates or unemployed, married women without children and already living in crowded industrial manufacturing centers. In some parts of the country, including at the Richmond Tank Depot, women who worked in ordnance plants were dubbed "WOWs," for Women Ordnance Workers.²⁷⁶

England had already established a national system by which women were required to register for assignment to work either in manufacturing, the military, or the civilian defense. Eleanor Roosevelt had advocated such a system for mobilizing American women since 1941. Paul V. McNutt, chief of the War Manpower Commission, had initially believed there would be enough men workers available, but by autumn 1942 he, too, wanted a National Service Act that would authorize him to register men and women alike and then direct them to workplaces where they were needed.²⁷⁷

There were difficulties in putting women to work within the existing legal framework intended to protect women. A 1939 California law prohibited employers from making women work more than eight hours per day or more than forty-eight hours per week. In February 1943, the California legislature passed the War Production Act, which authorized the governor to issue a permit to an employer that would allow that employer to have women work more hours than normally allowed under the law, if the work would further production in support of the war effort and if the work would not increase the risk of harming the health and safety of the women workers.²⁷⁸ On the other hand some of the difficulties in hiring women appeared to be imaginary. The War Manpower Commission had a program for training industrial workers for the war effort, and it routinely received requests for literature aimed specifically at training women. One of the program's managers responded:

We have so many requests from nervous employers for special material on the

²⁷⁶ "The Margin Now Is Womanpower," *Fortune* 27 (February 1943): 99-103, 222-224; Doris Kearns Goodwin, *No Ordinary Time: Franklin & Eleanor Roosevelt: The Home Front in World War II* (New York: Simon & Schuster, 1994), 364. The article in *Fortune* has some stunning photos of women working in factories. It also has some information on attitudes toward women workers. For example, there are some interesting stories about women wanting to wear stylish hair to work and refusing to take necessary safety precautions regarding their hair. There is also a description of the acronym, WOW, for Women Ordnance Workers that was promoted by Bridgeport Brass in Connecticut. It mirrored the names given women in the military (WAVEs, WAACs, WAFs). WOWs there even had a uniform of red bandannas and "handsome" blue coveralls (p. 223). Women workers at the Richmond Tank Depot were identified as WOWs in "Richmond Tank Depot, Richmond, Calif., 1 October - 31 December 1944," Vol. II, part 2, section of photographs.

²⁷⁷ "The Margin Now Is Womanpower," 100; Goodwin, *No Ordinary Time*, 364-365.

²⁷⁸ D.C. Moffitt to M.L. Wiesmyer, memorandum dated 22 February 1943, and Wiesmyer to Abbott and Jewett, memorandum dated 1 March 1943, HFM Acc. No. 371, box 16, folder 4.

training of women that I've asked my secretary to go out and buy a rubber stamp to use on every printed piece we send out, reading "this includes women, Negroes, handicapped, Chimamen, and Spaniards." The only difference between training men and women in industry is in the toilet facilities.²⁷⁹

Such evidently was the attitude of the Ford management at the Richmond branch, which was said to have been a "house of men." Prior to the war, only three women had worked at the Richmond branch: a daytime telephone operator and two typists. The shortage of workers, however, compelled the Richmond branch to hire women, and the managers quickly learned that women could make excellent industrial workers. For some tasks (work involving small details or tedium, said to require greater patience) they even concluded that women were superior to men. It is important to note, however, that women workers at Ford did not fall into their posts merely because of the manpower shortage. They also had a strong advocate at the San Francisco Ordnance District in the person of Rowenah M. Peters, Executive Assistant to the District Chief. She had begun working for the Office of the Chief of Ordnance in Washington, DC, in 1931. Peters transferred to the San Francisco District in 1933, and by the time World War II started she had the most seniority of the district's civilian staff. She had gained a respected reputation among industrialists and military staff alike for her understanding of ordnance production and for her expertise in personnel matters, and she was said to have paid official visits to more army ordnance facilities than any other woman in the U.S. She therefore took a lead role in convincing industrialists in the jurisdiction of the San Francisco District that women should be among the new recruits as companies mobilized to meet wartime demand.²⁸⁰

Her first such visit in autumn 1940 was to the Norris Stamping and Manufacturing Company, which had just received its second Ordnance contract under the pre-war mobilization programs. The company's president, K.T. Norris, also believed that women could make effective industrial workers, and he enthusiastically worked with Peters to move women into his production schemes. The Norris company is reported to have had one of the best records during the war of employing women toward a combination of effective production and of goodwill between workers and management. Other companies were not so receptive to the idea of employing women. The manager at Ford's Richmond plant was said to have been disdainful of the suggestion, and the manager at the Yuba Manufacturing Company in Benicia is said to have responded to Peters that he would not even consider the idea of hiring women. The Yuba company made gold dredges during peacetime, and the manager dismissed the notion that women could help turn the plant's lathes, drill-presses, and overhead cranes. Three years later, however, virtually all the ordnance producers in the San Francisco District were employing women, who had gained reputations, among other things, as skilled machine-tool and crane operators.²⁸¹

Women worked in all the sections at the Richmond branch during World War II. Of 332 women working there at the end of February 1945, ninety-five worked on the jeep assembly line. Curiously, two other main jeep assembly plants at Dallas and Louisville did not employ women.

²⁷⁹ Channing Dooley, quoted in "The Margin Now Is Womanpower," 102.

²⁸⁰ Hurley, "Women Man the Battle Stations," 2-4, 36.

²⁸¹ Hurley, "Women Man the Battle Stations," 2-5.

It was because of this distinction that jeep chassis assembly foreman Fred Willmer was said to have been especially proud that his plant routinely produced jeeps at the least cost of the three Ford plants. Tasks involved in jeep production that were filled by women included assembling and installing light switches, driving jeeps off the assembly line and taking each for a test drive, delivering jeeps to the army's Ordnance Inspectors, and draining gasoline from the tank in preparation for shipment. One of the dirtiest jobs in the plant involved dipping 25-pound sacks of parts (the heaviest load women were allowed to lift under California law) in a thick, black anti-rust fluid prior to sorting them into boxes for use by workers along the jeep assembly line. A woman named Bette Hargrave held that job in 1945. Georgette Bittich was one of the women who gave jeeps their 5-mile test drive before delivering them to the Ordnance Inspectors. The bodies of the twenty or so jeeps she tested daily were said to be still so hot from the paint-curing oven that she had to sit on a pillow to shield her from the radiant heat, which abated after about a mile on the road.²⁸²

In the Tank Depot, women worked at numerous jobs, including wrapping machine gun parts for shipping. The parts were already coated with grease. A woman would grab the necessary parts and wrap them in grease-proof paper. After labeling the package, she would dip it in hot wax. When the wax cooled, she would wrap the package again in paper and label it, this time sealing the label with cellophane tape. Other women wrapped radio parts for the tanks. Some of the tank radios were manufactured to different specifications than those finally selected for particular tanks. This meant personnel at the Ford plant, often women, had to disassemble the radios and re-wire them according to the new requirements. Reportedly, women were usually selected for the radio work because it was highly repetitive and they could maintain the attentiveness necessary to achieve quality work. Other women would wrap radio parts in paper and wax, similar to the way other women wrapped gun parts, and then they placed the wrapped radio parts in wooden boxes. As a final sealant, they would paint tar along the edges of the boxes. Often women would remark that they took great care with their jobs because a vehicle they outfitted or a part they wrapped might be used by a loved one, a son, grandson, or nephew, fighting in either the European or the Pacific theatre.²⁸³

As mentioned in an earlier section, the Carpentry Shop behind the Richmond plant made all the wooden crates for shipping vehicles and parts overseas. Skilled carpentry was another task that men at Ford had once thought women could not master, but in 1945 the foreman of the Carpentry Shop considered his women workers to be highly skilled and faster than the men who used to work there. He had a couple of women on his crew who were grandmothers.²⁸⁴

Isla Buster worked in a department that packed lights and related equipment. She and her husband had moved to Richmond from Lubbock, Texas, when their son, Bob, enlisted in the Army Air Force to serve as a gunnery sergeant. She said, "Our pledge to Bob when he joined was that we would work in defense 'till he comes home, and we're going to keep it."²⁸⁵

²⁸² Hurley, "Women Man the Battle Stations," 43-47, 58-61.

²⁸³ Hurley, "Women Man the Battle Stations," 48-57.

²⁸⁴ Hurley, "Women Man the Battle Stations," 69-71.

²⁸⁵ Hurley, "Women Man the Battle Stations," 64.

Another job in preparing vehicles for shipment was called "blue freeze." It derived its name from the tape, originally blue, that workers used to seal all openings on tanks and other larger vehicles that were not crated in wooden boxes. The work was conducted outdoors on the pier adjacent to the Ford plant, and many of the workers were women.²⁸⁶

Women also worked for Ford in the Service Stock Department. Dealerships and repair shops throughout Richmond's expanded service region sent orders to the Richmond branch for parts, and workers in the Service Stock Department filled the orders. Several women were pickers and packers, meaning they picked the ordered parts off the shelves and packed them for shipment. Eva Rost was a picker who started work at Ford in July 1943. Her husband was a SeaBee in the Pacific theatre, and her two step-sons were also in the military. In early 1945 she said, "I'd rather work while they are gone, but when my husband comes home, any soldier that wants it can have this job."²⁸⁷

Some of the women working at the Richmond Tank Depot were not Ford employees but rather worked for the army in either the Ordnance Department or the Signal Corps. The latter worked under the command of the Ordnance Department but had sole responsibility for inspecting radios and other communications equipment on the vehicles processed at the Richmond Tank Depot. The Signal Corps detachment at Richmond had one military officer, a lieutenant, and a civilian in charge. They were both men, as were the civilian technicians who worked for the Signal Corps. All of the Signal Corps inspectors were women. Women also worked as Ordnance Department inspectors. When the U.S. had entered the war, Ordnance inspectors had been men, and they were initially eligible for deferments from the draft. By summer 1942, however, it was nearly impossible for men to continue to receive draft deferments solely for being trained Ordnance inspectors. In July 1942, the Ordnance Department began to explicitly recruit and train women to serve as inspectors, training them along with eligible men. Training of Ordnance inspectors had long been conducted at Arsenals, but to meet the new demand the Ordnance Department established special training programs at other institutions. For example, the Los Angeles region of the San Francisco Ordnance District established a special training school at the University of Southern California, which enrolled its first class in February 1942. By the time the third class enrolled in July 1942, two-thirds of the trainees were women.²⁸⁸ After some experience with women inspectors, Ordnance concluded they often made superior workers:

It was found that women inspectors were inclined to be more careful on details, did not become dissatisfied with monotonous work and were not continually asking for advancement. They were used more and more in inspection work, even

²⁸⁶ Hurley, "Women Man the Battle Stations," 64-69.

²⁸⁷ Hurley, "Women Man the Battle Stations," 62-63.

²⁸⁸ Hurley, "Women Man the Battle Stations," 54; "Richmond Tank Depot, 1 January - 30 September 1944," unpublished historical report in NARA RG-156, Entry 646, box A599, San Francisco Ordnance District, Vol XXIII, Part 1, p. 33, photograph of Signal Corps personnel; "San Francisco Ordnance District History, 1939-1942," unpublished historical report in NARA RG-156, Entry 646, box A576, San Francisco Ordnance District, Vol I, Part 4, pp. 38-42.

being placed on such work as tank assembly to inspect welding procedure.²⁸⁹

The Richmond plant had several employees whose specific jobs arose when Ford began hiring women. Angela Zatta, a native of Italy, was custodian of the women's rest rooms. Stella DeJarnett and her husband, a wounded veteran of World War I, moved to Richmond from Fresno at the beginning of WWII to work in war production. Her job at Ford's Richmond branch was Matron of Women, a sort of in-plant police officer for women, who could observe activities of workers throughout the facility, including women's rest rooms. When the Richmond branch began employing women, it established a separate first aid station for them. Molly Mansfield was the registered nurse who staffed it. Edna Guyn served as the women's counselor at the Richmond branch. She had an office, but conducted most of her counseling as she walked about the plant. Women could raise any issue with her, whether about family matters at home or troublesome situations at work. She was able to help resolve some issues informally that otherwise might have led to formal grievances.²⁹⁰

Much of the above information on women workers at the Richmond Tank Depot derives from a report called "Women Man the Battle Stations" prepared by Fern Hurley for inclusion in history of the San Francisco Ordnance District. Hurley visited the Richmond plant on 28 February and 1 March 1945, interviewing foremen and women production workers. Following is a list of women reported by Hurley to have been working at the Richmond branch at the time of her visit in 1945:

Theodora Acredolo	Edna Guyn	Carrie E. McDonald
Sue Allen	Bette Hargrave	Dolores McDowell
Mary (Zatta) Baldwin	Agnes Harrington	Fay Moore
Aline Beaird	Bessie Harris	Lottie Mott
Georgette Bittich	Edith Heller	Valborg (Olsen) Ney
Blanche Bottini	Flonnie Helm	Arline Noyes
Ivadel Brown	Lucille Helzer	Emma Nuti
Mary Bruce	Addie Henderson	Bertha Parker
Isla Buster	Virginia Hinman	Elberta Peters
Betty Carder	Jean Jackson	Marie Phelan
Fannie Caswell	Irene Jones	Doris Phillips
Patricia Clifton	Mary Jones	Anita Pike
Jennie Darling	Pearl Kallenberger	Kathryn Ray
Stella DeJarnett	Jessie Loera	Eva L. Rost
Margaret Dennis	Inez Lonnon	Edith Sadie
Ruth Fisher	Bertha Looney	Eunice Smith
Trini Garcia	Bertha King	Ann Stiefel
Louise Gaylord	Molly Mansfield	Helen Taylor
Ada M. Gerken	Bessie Martin	Nadine West
Marie Grubes	Ann McDonald	Angela Zatta

Hurley described the work some of the women were doing, but she devoted as much attention in

²⁸⁹ "San Francisco Ordnance District History, 1939-1942," 42.

²⁹⁰ Hurley, "Women Man the Battle Stations," 39-43.

her report to other aspects of the women's lives, especially in three areas: 1) their background and what brought them to work at Ford, 2) family members serving in the armed forces, and 3) how other members of the family, especially children, help the women take care of the work necessary to maintain a home.

CHAPTER SIX: EPILOGUE: RE-CONVERSION and CLOSURE

A. Re-Conversion Planning

When production at the Richmond Tank Depot began to decline in the summer of 1944, after the production peaks of May and June, the Ford Motor Company managers at the Richmond branch began turning their attention again to assembling automobiles for the civilian market. In his third quarter 1944 report, Maj. Delbert Ball, commanding officer of the depot, reported observing that Ford employees had begun rearranging conveyor lines and stock, evidence to Ball that they were beginning to prepare for reconversion to civilian production. He reported that Ford officials had assured him that they were committed to the war effort as long the other automobile manufacturers were, but Ford hoped to be the first to return to commercial production when the government lifted its restriction on making cars for the civilian market. Based on his assessment of the situation, he believed that the Richmond plant would be able to resume commercial production within sixty days. Ford did little more to prepare for reconversion until May 1945, when the level of Ordnance production again began to decline as the war drew to an end. Company officials met with officials of the San Francisco Ordnance District to propose that the Richmond Tank Depot be relocated to one of Kaiser's Richmond shipyards. Ford suggested that it could continue to serve as the contractor for the depot functions, but physically removing the depot operations from Ford premises would allow the company to resume civilian production. The main drawback to the proposal, from Ford's perspective, was that a shipyard would not be available until September. The idea was not acted upon.²⁹¹

Ford records show that by May 1945 Abbott was "anxious to get rid of the Jeep job" and reconvert the Richmond plant to civilian production. Max Wiesmyer, who was in charge of Ford's department of branch operations in Dearborn, sent a memo to G.A. Moss in the planning & scheduling department saying that Abbott reported an inventory of considerable jeep stock in Richmond and asking Moss to balance Richmond's supply of stock so that the jeep contract could be terminated soon.²⁹²

Positive steps toward reconversion began to take place in June, when Ford developed plans to move all Ordnance activities from the second floor of the Richmond branch, clearing the way for the area to serve again as the body department for the production of civilian autos. Part of the plan involved moving Signal Corps facilities elsewhere. Ford also planned to move stock parts that were not in high demand to the Salt Lake City branch. It quickly became obvious, however, that the war against Japan would soon end, so moving the Signal Corps for such a short period seemed inefficient, and its equipment remained on the second floor for the duration of hostilities. In mid-September, Ford superintendent Abbott sent Captain Spiker a letter requesting that removal of the Signal Corps equipment from the second floor be expedited so that the company could proceed with reconversion. Abbott said Ford intended to resume assembling

²⁹¹ "Richmond Tank Depot, Vol. II, part 1, 1 October to 31 December 1944," 3-4; "Richmond Tank Depot, Vol. IV, 1 April to 30 June 1945," 81; Arthur S. Hatch to J.R. Davis, letter dated 15 May 1945, HFM Acc. No. 371, box 17, folder 4.

²⁹² M.L. Wiesmyer to G.A. Moss, memorandum dated 10 May 1945, HFM Acc. No. 371, box 17, folder 4.

civilian autos on November 1st.²⁹³

Ford received authorization on July 20th from the War Production Board to resume truck production at its Richmond, Chester, Chicago, and Somerville branch plants and began assembling civilian trucks at Richmond in August 1945, shortly after the last jeep rolled off the assembly line. It cost Ford about \$11,000 in labor and materials to rearrange conveyors and other equipment in such a configuration that the Richmond plant could assembly Ford light trucks instead of jeeps. The first civilian truck rolled off the Richmond assembly line on August 29th. The company had hoped to begin assembling civilian autos by November 1st, but strikes by workers at some parts suppliers delayed automobile production at Richmond. Instead, Ford shipped some fully assembled new cars from Detroit, which began arriving at Richmond on October 26th. Richmond did not complete its first civilian automobile until December 6th.²⁹⁴

B. Production during the 1940s & 1950s

Once Ford got its civilian production system operating again after the war, the Richmond plant was one of the Ford division's fifteen branch assembly plants in the U.S. Counting Lincoln, Mercury, and Ford truck divisions, the Ford Motor Company had seventeen assembly plants total in the U.S. In 1950, the Richmond plant was assembling about 325 cars and trucks each day. The previous year, it had produced about 60,000 vehicles. In 1950, the Richmond plant had about 1,600 production workers and salaried employees on the payroll. The company no longer used ships to transport parts from Dearborn to Richmond, relying entirely on railroad cars. One change in the company's parts policy was that plants like Richmond acquired some of their parts from local suppliers. Richmond bought about 25 percent of the parts it needed from manufacturers in northern California. Each day, the plant received about thirty carloads of parts from Dearborn and other suppliers. Outgoing shipments totaled about forty carloads daily (because cars could not be loaded as densely as parts). Each year, the Richmond used about \$50,000,000 in materials to assembly its slate of cars, and it accrued almost \$7,000,000 in transportation charges.²⁹⁵

C. Closure

In the early 1950s, speculation arose that Ford would move its plant out of Richmond. This was due, in part, to the huge increase in population on the West Coast because of all the people who had moved there during the war years to work in industries supplying the war effort.

²⁹³ "Richmond Tank Depot, Vol. IV, 1 April to 30 June 1945," 168; "Richmond Tank Depot, Vol. V, 1 July to 30 September 1945," 140-141, 160; W.A. Abbott to Capt. G.A. Spiker, letter dated 13 September 1945, exhibit Bb, p. 160 of Vol. V; W.A. Abbott to M.L. Wiesmyer, memorandum dated 5 June 1945, HFM Acc. No. 371, box 17, folder 4.

²⁹⁴ "Richmond Tank Depot, Vol. V, 1 July to 30 September 1945," 3, 27; "Richmond Tank Depot, Vol. VI, October 1945," 1; budget attached to W.A. Abbott to M.L. Wiesmyer, memorandum dated 8 June 1945, and L.V. Brown to Wiesmyer, memorandum dated 20 July 1945, both in HFM Acc. No. 371, box 17, folder 4; Richmond Assemble Plant, "History - Report May 1, 1952," included in M. Wiesmyer, "Branch Operations - Richmond," preliminary draft report dated 26 April 1956, HFM Acc. No. 106, microfiche.

²⁹⁵ "Ford: Richmond Plant Facts," brochure dated ca. 1950, HFM Acc. No. 951, box 18.

The increased population meant an expanded market for cars and trucks, and Ford wanted to correspondingly expand its West Coast capacity to assembly vehicles. Ford management in Dearborn wanted to double its assembly capacity in the San Francisco Bay Area to meet demand, and the property in Richmond did not have the space needed to accommodate expansion of the plant. The Richmond community, of course, wanted to persuade Ford to stay. Dearborn sent W.A. Abbott a memorandum in February 1953 describing how he should explain to local people why additional land near the existing Richmond plant would not induce Ford to stay. He was instructed to tell people, "You can't 'splice on' to an assembly line. To increase capacity, each department within a plant must be expanded, and the building of an addition is not the simple solution."²⁹⁶ Shortly thereafter, the Ford Motor Company sent its Richmond employees a letter stating that the company would build a new plant elsewhere within a 50-mile radius of San Francisco and assuring the employees that they would be offered transfers to the new plant when it opened. At the same time, the company issued a general press release announcing that it had sent the letter to its employees and indicating that the company welcomed inquiries from parties who might be interested in acquiring the Richmond plant.²⁹⁷

Two weeks later, Ford issued another press release stating that the company had acquired 160 acres of ground in Milpitas, north of San Jose. The new assembly plant to be built there would be one story, enclosing 1,000,000' of industrial space (about twice that in the Richmond plant). There would also be a two-story office building attached to the plant. Interestingly, the press release described how the building would be designed. Just as in the early part of the twentieth century, the company would first develop a complete layout for the operation, and then it would design an appropriate building to envelope the layout.²⁹⁸

Ford closed its Richmond plant in February 1955. Most of the Ford employees moved with the operation to Milpitas. Members of the faculty at the University of California at Berkeley conducted a study, headed by John T. Wheeler of the School of Business Administration, to explore the social and economic consequences of the move on the workers. One of the academics, Bennett M. Berger, published his findings as a book: *Working-Class Suburb: A Study of Auto Workers in Suburbia*. In his preface, Bennett mentions that about 25,000 people lived in Richmond in 1941, and that the population quadrupled in two years because of the surge in employment at Richmond's Kaiser shipyards. In an effort to provide housing for those new workers and their families, the federal government built "row upon row of barracks-like emergency housing." Many of Ford's employees at the time of the Richmond closure had moved to Richmond because of the wartime employment. People from Arkansas and Oklahoma were especially numerous among Ford's post-war workers in Richmond. Many of those new arrivals to Richmond had lived in emergency housing during the war, and Bennett reported that 38 percent of the Ford employees he interviewed in Milpitas had still been living in emergency housing when Ford's Richmond branch plant closed in February 1955. According to Bennett, more than half of the Ford workers who moved to Milpitas told him that they were immediately happy to learn the news that the Ford operation would be moving out of Richmond, in part

²⁹⁶Memorandum dated 3 February 1953, HFM Acc. No. 429, box 2, Richmond - San Jose Statements folder.

²⁹⁷Ford Motor Company press release dated 4 February 1953, HFM Acc. No. 429, box 2, Richmond - San Jose Statements folder.

²⁹⁸Ford Motor Company press release dated 16 February 1953, HFM Acc. No. 429, box 2, Richmond - San Jose Statements folder.

because of the substandard housing.²⁹⁹

That preference on the part of Ford's Richmond workers to leave for what they considered a more desirable living environment does not subtract from the historical significance of the built environment in which they lived and worked during World War II.

²⁹⁹ Bennett M. Berger, *Working-Class Suburb: A Study of Auto Workers in Suburbia* (Berkeley: University of California Press, 1971), iii-ix, 21-22.

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The San Francisco News

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ADDENDUM TO:
ROSIE THE RIVETER NATIONAL HISTORICAL PARK, FORD ASSEMBLY
PLANT

HAER No. CA-326-H

(Rosie the Riveter National Historical Park, Richmond Assembly Plant
Rosie the Riveter National Historical Park, Richmond Tank Depot)
Rosie the Riveter WW II Home Front National Historical Park
1400 Harbour Way South
Richmond
Contra Costa County
California

PHOTOGRAPHS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
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Washington, DC 20240